INDIVIDUAL DIFFERENCES IN TIME NEEDED TO LEARN: TEACHER COPING STRATEGIES

by

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Abstract

This study was conducted to investigate how teachers cope with the differential time needs of students. Time was considered within an economic framework and was conceptualized as a limited resource. The task of teaching was considered as the optimization of learning within the constraints imposed by the collective nature of the classroom. Two major constraints considered were the limited time available for schooling, and the variability in student time needs. It was assumed that the classroom makes three goal-like demands on the teacher: coverage of curriculum material, the engendering of mastery by students of that material, and the securing of student attention or cooperation. As none of these goals may be realized without compromising success at achieving the others, the problem was considered as involving tradeoffs of coverage, mastery and cooperation.

Observations were conducted in five grade 3 classrooms in a school district in the lower mainland of British Columbia. The investigator visited each classroom for one day each week during the Fall term. The methodology was naturalistic. Narrative specimen records were written during each visit, the on-task rates of each student for academic and non academic activities were recorded every five minutes and informal interviews with the teachers were conducted.

The strategies used by the teachers to cope with variability in time needs are described, and interpreted from a utilitarian perspective. The strategies appeared to
function to keep a class operating as if it were a single organism; keeping the class together may avoid the managerial and instructional difficulties inherent in teaching classes of students with diverse time needs. The teacher is conceptualized as a utilitarian pragmatist who optimizes the learning of the class, rather than the learning of individual students. It is suggested that the enhancement of teacher utilities is achieved through the creation and maintenance of an equilibrium between the time needs of the individual and the time needs of the class. Specifically, it is argued that classroom processes may be interpreted as functioning to effect a balance between coverage, mastery, and cooperation. Underlying this interpretation of teaching is a model of the classroom as a homeostatic system.
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I also wish to express my thanks to the five teachers who so obligingly permitted me to spend time in their classrooms. The view of teaching presented in the following pages is not intended to reflect an uncharitable picture of teachers, but to identify some of the constraints which exist in classrooms.

I owe a particular debt of gratitude to my research supervisor, Dr. Marshall Arlin whose support gave me the confidence to pursue my interests. For time given graciously, for the sharing of ideas, and for intellectual comradeship in general, my gratitude knows no bounds.
CHAPTER 1

Individual Differences and the Collective Nature of Schooling

Social organizations are fraught with an inherent dilemma: a necessary tension exists between meeting the particularistic needs of the individual and the universal needs of the group. Classrooms may be regarded as social organizations in which a similar antagonism between the needs of the individual and the needs of the group exists. One area where the needs of the individual and the needs of the class are in conflict is in the amount of time required to learn. The present study was an exploration of the strategies developed by some grade three teachers to deal with individual differences in time needed to learn. It was anticipated that an investigation of attempts to resolve this fundamental conflict might illuminate basic classroom processes.

Barr and Dreeben (1977) suggested that conceptualizations of teaching and learning are dominated by a tutorial model, yet the classroom is a collective situation. Traditionally, the central obligation of teaching has been to provide learners with experiences which will lead ultimately to growth in societally approved skills. A necessary condition for the fulfillment of this obligation is that teachers present the material to be learned and that students spend time studying it. In a tutorial situation the time needed to learn is not inherently problematic: the rate at which the teacher presents the new material can be adjusted to
the time needs of the individual learner. Difficulties arise when education must be provided for groups of learners. Individual differences in time needed to learn present the teacher with a dilemma: there will be some children who require more time and some less time than she has allocated. A primary purpose of this study is to document how some grade three teachers deal with variation in rate of learning in their classes.

Variation in time needed to learn which precludes that students will acquire knowledge and skills in unison presents something of a challenge to teachers. However, differences in learning rate are not, ipso facto, problematic. A central thesis of this study is that it is the peculiar constraints of organized schooling which exacerbate the difficulties for teachers. Typically, school curricula are designed so that prescribed amounts of subject matter content are assigned to be covered at particular grade levels. Yet teachers are required to instruct classes of children who differ in the amount of time they need to learn. It is this dual requirement of coverage of a certain amount of material in a standard amount of time which makes the problem of individual differences in learning rate particularly trenchant.

Several solutions to this problem of differential time needs present themselves for consideration. Perhaps a reduction in the challenge facing teachers could be accomplished by the general acceptance of wide variation in student learning within a grade level. To what extent
teachers can manage programs which allow for wide variation in student learning is a moot point. Alternately, time might be allowed to vary so that those who learned in less than the allocated time might be permitted to engage in other pursuits, while those who learned more slowly would be required to spend more time in school. Cronbach (1967) rejected this latter alternative on the grounds that it "would extend the education of some youngsters until they were oldsters" (p. 25).

Fundamental differences amongst children in the same grade in terms of time needed to learn, coupled with the constraints of a common curriculum and a limited amount of time in school, likely present practical problems which do not admit of simple solutions. The strategies developed by teachers to meet this challenge were the focus of the present study.

The problem faced by the teacher is conceptualized as the optimization of student learning within the constraints imposed by the collective nature of the classroom. Two major constraints considered in this study were the limited time available for schooling and variability in student time needs. It was assumed that the classroom makes three goal-like demands on the teacher, none of which can be achieved without compromising success at achieving the others. These goals are the coverage of a body of curricular material, the engendering of mastery by students of that material, and the securing of student cooperation or attention in the interests of effective class management (cf. Abrahamson, 1974; Westbury, 1980). The collective nature of the educational enterprise means that all
goals cannot be accomplished in the limited time permitted for schooling. In situations where objectives are in conflict, or no acceptable alternative exists, the predicament facing the decision maker has been characterized as involving value tradeoffs (Keeney and Raiffa, 1976). In essence the decision maker is required to weigh, albeit intuitively, the value of achieving one objective compared to another. Accordingly, the dilemma facing teachers of meeting the needs of the class and the needs of the individual was considered as a problem involving tradeoffs between coverage, mastery and cooperation.

It is appropriate at this juncture to indicate the sense in which the words coverage, mastery, and cooperation are used in this study. This is particularly important with reference to mastery because of its association with the mastery learning tradition (Bloom, 1968). Within the mastery learning tradition, mastery refers to a particular criterion level of achievement (typically 80%). In this study, mastery is conceived as a continuum which indicates the degree or depth of skills, knowledge or learning acquired by students. No fixed criterion level is implied, and mastery is used in a relative rather than an absolute sense. In contrast to mastery or depth of learning, coverage is used to refer to the breadth or amount of curricular material to which students are exposed. Cooperation is used to refer to student attending behavior as measured by on-task rates.

Individual Differences and Speed of Learning
As a preface to the investigation of teacher strategies, how individual differences and the relationship to learning have been regarded in the educational literature is considered. Individual differences in learning is a well documented phenomenon which has been accepted by many educators and psychologists (Anastasi, 1967; Ellis, 1932; Tyler, 1965). Tyler (1965) discussed variability in school accomplishment as the rule rather than the exception. Referring to a study by Learned and Wood (1938) she pointed out that differences within a grade are far greater than the average difference between grades. Thomas and Thomas (1965) concerned with how teachers deal with individual differences in the classroom argued that variability in human learning may be expressed as variability in speed of learning. It is the variability in the speed of learning which they considered to be problematic for teachers. One of the difficulties they mentioned is the problem of conducting a heterogeneously grouped class at an average speed which they believe leads to the faster students being held back and the slower students being overwhelmed.

Ellis (1932) also discussed speed of learning and the practical difficulties involved in educating faster and slower "thinkers" in the same room. The teacher apparently has to choose between the Scylla of frustration and the Charybdis of boredom. He argued that if the teacher adapts the work to the brighter students "he talks over the heads of the majority of the class and he travels too fast for them" (p. 449).
Conversely, he argued that adaptation of instruction to the slower members of the class raises the spectre of boredom for the better students by "dwelling too long on simple things" (p. 449). Ellis' solution to the problem was to delay entry into school until children had attained the appropriate mental age and then to classify the children properly.

These discussions of speed of learning appear to have been motivated by the efforts of differential psychologists to classify and quantify variation in mental ability. In other words, speed of learning was treated as an adjunct of an abilities view of learning rather than as a classroom problem in its own right. Common sense dictates that the existence of faster and slower learners will appear as a problem whenever the requirement of coverage of the curriculum in a limited time exists in a group setting. A review of some of the literature of the last hundred years indicated that the problem of individual differences was apprehended, but was not placed in the context of differential time needs in learning.

**Traditional Methods for Dealing with Fast and Slow Learners**

An historical perspective validates the common sense notion that the existence of faster and slower learners within the same classroom is problematic in terms of coverage of the curriculum. The difficulty of covering the required material in the allotted time is implicit in many of the discussions of early teacher trainers (Bagley, 1907; Bagley, 1917; Bennett, 1917; Dutton, 1903; Sears, 1918; Seeley, 1903; White, 1893);
preservice and inservice teachers were exhorted to make every minute in school count. Although the difficulty of curriculum coverage with faster and slower learners was not addressed explicitly, four strategies which appear to be attempts to alleviate the problems associated with individual differences in time needed to learn were identified; they are ignoring, adapting, grading, and grouping.

**Ignoring.** The writers of the late nineteenth and early twentieth century textbooks (Bagley, 1907; Bagley, 1917; Bennett, 1917; Dutton, 1903; Sears, 1918; Seeley, 1903; White, 1893) rarely directly addressed the problem of faster and slower learners. The picture generated by these early textbook writers is that of classes proceeding through a common curriculum at a uniform rate. However that the problem of differential learning rates existed, and was dimly perceived, is reflected in the extensive discussions of promotion practices. It seems that annually, or semiannually, student progress was reviewed. Those who had covered the material, and had made the grade, were promoted while those who failed to keep pace were required to repeat the year's work. Such was the general concession to individual differences. Once the ritual was over for the year presumably the ignore strategy could be returned to its position of preeminence.

**Adapting.** Although the tendency to ignore individual differences in time needed to learn appears to have been widespread there were some experimental programs which attempted to adjust the pace of instruction to individuals.
The Batavia plan (Bennett, 1917) instituted in New York city, utilized the services of an extra teacher in the classroom to provide tutorial help so that pupils could be promoted more rapidly. The Pueblo plan (Bennett, 1917) was similar to latter day mastery learning in that it permitted time to vary according to the needs of individual students. The Cambridge double-track plan (Sears, 1918) acknowledged the necessity of different paces of instruction by dividing curricular content into two sections to accommodate fast and slow learners. None of these innovative alternatives to whole class teaching, which involved the adaptation of the rate of curricular materials to the time needs of children, appears to have been widely utilized. A reasonable conclusion is the strategy of ignoring individual differences was functional in that it enabled teachers, lacking in sophisticated training, to deal with the problem of bringing vast numbers of children to minimal levels of competency in basic subjects.

Grading. The rise of the testing movement after World War One not only sensitized educators to individual differences in ability, but provided means whereby these could be quantified. Accordingly, tests were used to segregate children into classes on the basis of ability. Breed (1933) made it abundantly clear that the impetus to "grade", or to sort, was provided, not by the philosophical conviction of the need to accommodate individual differences, but by the more pragmatic consideration of the problem of pace. Classes composed of children with heterogeneous
learning rates posed the problem of appropriate pacing. The solution was to group together children high in ability who learned quickly so that they could cover the material at a faster rate. Children low in ability who learned more slowly were also grouped together so that they could cover the work at a slower rate.

The assumption seems to have been that the placement of children who were homogeneous in ability in the same grade would make homogeneous pacing more efficient. A fundamental flaw in the rationale of the grading approach was the assumption that homogeneity of ability or achievement was uniform across several school subjects. In other words, it was anticipated that if a class was homogeneous on one dimension, for example reading, they would also be homogeneous on other dimensions. It was demonstrated that a reduction of the within class variance on one dimension was not necessarily accompanied by a reduction of within class variance on other dimensions (Goodlad and Anderson, 1959). (This assumption is discussed further in chapter three in the section entitled "narrowing the range"). Accordingly, grading turned out not to be the pedagogic panacea.

Grouping. The formation of classes homogeneous in ability tends to be eschewed by modern educators as elitist in nature: heterogeneous classes are preferred on sociological and academic grounds (Esposito, 1973; Rosenbaum, 1980). This shift in philosophy again confronts the teacher with the problem of fast and slow learners and the difficulty of
choosing an appropriate pace. Many primary teachers choose a grouping strategy to ameliorate pacing difficulties (Barr, 1975). Grouping refers to the practice of subdividing children, within the same class, into groups for instruction. The grouping of children within the same class may help accommodate faster and slower learners, but likely presents the teacher with time allocation difficulties. A critical problem of grouping is the question of how much instructional time a teacher can provide for each group, given that the total time for teaching remains constant. How far grouping ameliorates pacing difficulties at the expense of exacerbating time allocation problems is worth considering.

Four ways of coping with the problem of faster and slower learners have been identified. Adapting the rate of instruction within a class appears to have been used in a limited way, and in programs which were recognized as innovative. Ignoring, grading and grouping were identified as major coping strategies preferred at different times during the last hundred years. The widespread use of the strategies suggest that they were responses of education systems, rather than of individual teachers, to the problem of differences in learning rates. The problem faced by education systems, how to accommodate students with differing time needs, is also faced by the individual teacher within a classroom. In spite of the apparent difficulties inherent in differential learning rates, the regularity with which countless teachers confront numerous classes suggest that coping mechanisms evolve. Given
the complexity, multidimensionality and the simultaneity of classrooms (Doyle, 1979; Jackson, 1968) and the collective nature of schooling (Dreeben, 1970), the emergence of several strategies was anticipated. The types of strategies used by teachers, and the particular function they serve, were investigated in the present study.

Time Needed to Learn

Human variation in abilities is often expressed as variation in level of learning, or achievement, rather than as variation in time needed, or rate of learning. In the traditional view individual differences in achievement are purported to reflect differences in basic abilities or aptitudes (Tyler, 1965). The assumption is that as an organismic variable, ability or aptitude is a relatively enduring and stable characteristic of the individual which is not amenable to large change through environmental manipulations. An alternative way of viewing individual differences was proposed by Carroll (1963); the concept of time was introduced as a central variable in school learning. In the Carroll model the usual conception of aptitudes as predicting the level of achievement, given constant instructional time, is transmuted to a conception of aptitudes as predicting the time necessary to reach a given level of performance, under conditions of optimal instruction. In effect individual differences in aptitudes are conceptually transformed into individual differences in learning time. It
should be noted that this conceptual transformation does not logically entail a rejection of the premise of relatively stable individual differences.

The Advantages of Time as a Metric

The reconceptualization of individual differences in abilities as differences in time needed to learn does not merely satisfy the dictates of academic aesthetics. Both Carroll (1963) and Bloom (1974) applauded the advantages of time as a ratio scale: it has an absolute zero point and equal units of measurement. Bloom (1974) also pointed to the fact that it allows clear and unambiguous comparisons of individuals. It is this latter point of comparability amongst individuals which makes time an attractive metric for those who seek to understand the complexities of the teacher's task. From an abilities viewpoint, the differentiation of children requires extensive psychometric assessment which is time consuming, and often not available to either a teacher or a researcher. On the other hand, differences between children in terms of the time required to finish assignments, learn multiplication tables, and to read stories is readily and frequently available to an observer. Therefore, it is proposed that the conceptualization of variation in human learning in terms of time is a pragmatic way of investigating the difficulties that individual differences present to the teacher.

In the Carroll model time taken to reach a particular
level of achievement is of significance. This permits the calculation of a variable, learning rate, which reflects the amount learned per unit of time. On a day-to-day basis it seems unrealistic to anticipate that a concept as precise as learning rate will have utilitarian value for busy teachers. It is proposed that the work of the teacher is perhaps more appropriately characterized by the monitoring of assignments than by the precise assessment of achievement. Consequently, speed of working, or rate of performance, rather than learning rate which involves the assessment of student achievement, is likely of greater practical significance. It is suggested that time needed to finish assignments, rather than time needed to learn (in the sense of measured achievement), is of immediate interest to teachers. Therefore, how teachers cope with individual differences in performance rates, rather than learning rates, was the central concern of this study.

*Time as an Educational Resource: An Economic Analogy*

The conceptualization of individual differences in terms of observable time elements has the additional advantage that the educational needs of children may be expressed in terms of the amount of instructional time needed. In other words, time may be treated as if it were a resource and therefore capable of being allocated to students in much the same way as textbooks and other resources. Large scale studies of the relationship between time and achievement (Borg, 1979; Fredrick and Walberg, 1980; Wiley and
Harnischfeger, 1974) support the idea that potentially time is an important resource for learning. The treatment of time as a resource and its influence on achievement is known as a production function view of schooling (Thomas, 1971). In the production function formulation time is regarded as an input and student achievement as an output.

Barr and Dreeben (1977) argued that if a production function view of education, where inputs are transformed into outputs, is accepted, then it becomes important to understand the processes which control the allocation of resources. Although their original argument referred to understanding the processes which control resource allocation for an educational system, it seems equally as apposite at the level of the classroom. A production function view of the classroom, where time inputs are transformed into achievement outputs, lends urgency to the necessity of understanding the processes which control the allocation of resources at this level. Although the amount of time available for school learning typically has a fixed legal limit (which in British Columbia is 25 hours per week), elementary teachers have considerable jurisdiction regarding how that time will be used. Given that time is a limited resource it seems unlikely that teachers will be able to provide optimally for all learners. How they attempt to meet the time needs of students, within the constraints imposed by the collective nature of schooling, was the concern of this study.
The Nature of the Study

The particular style of this endeavour warrants some prefatory remarks. The intention was to "hold a mirror up to nature" in order to reflect life in classrooms as it is lived. The methodology then was naturalistic rather than experimental; the emphasis was on description rather than manipulation and control of variables, on hypothesis generation rather than hypothesis testing. One characteristic of the naturalistic approach is that the phenomena under investigation dictate the conceptualization of the research problem. Within the naturalistic framework, the research problem is dynamic rather than static, typically undergoing development and modification. It is appropriate at this juncture to indicate the development of the problem in the current investigation.

The Development of the Problem

The current investigation began with the question of how teachers cope with students who differ in time needs, when their responsibilities include covering a particular curriculum in a limited amount of time. Time was considered to be a limited resource which would be used by teachers to enhance student learning. It was anticipated that students would vary in the amount of time they needed to do work, but it was assumed that teachers would accommodate to student needs in accordance with the dictates of maximizing student
learning. The accommodations made by teachers were expected to reveal coping strategies.

A fundamental assumption underlying these expectations, and according to Doyle (1979), an underlying premise of most research on teaching, is that teaching is a rational act which may be understood in terms of means and ends; teaching is seen as the means to reach the objective, student learning (Gage, 1978). Consequently, the original assumption made, that time in school would be utilized by teachers to enhance student learning, is an assumption shared by most researchers of teaching. During the course of the present study, it became apparent that the conceptualization of the role of the teacher as maximizing student achievement was inadequate to account for the data collected. In some cases, the data suggested that rather than enhance learning, the teacher actively manipulated conditions to prevent learning from occurring. These observations which ran counter both to intuition, and to established beliefs about the function of teaching, demanded explanation.

In order to accommodate the counter-intuitive observations, a reconceptualization of the role of the teacher is proposed. It is suggested in the present study that classroom processes make better sense, if they are interpreted as functioning to enhance teacher utilities rather than to maximize student learning. To support this view the argument is advanced that the enhancement of teacher utilities is achieved through the creation and maintenance of an
equilibrium between the time needs of the individual and the time needs of the class. Specifically, it is argued that classroom processes may be interpreted as functioning to effect a balance between coverage, mastery, and cooperation. Underlying this interpretation of teaching is a model of the classroom as a homeostatic system. The remainder of this report is an attempt to document how teacher strategies for coping with individual differences in time needed to learn may be interpreted as an effort after equilibrium.

The idea of equilibrium has provided the basis for much theorizing in psychology.

The common denominator of the various dynamic approaches in psychology is the conception of living things as systems which tend to maintain a dynamic equilibrium in relation to their environment. The individual is conceived as a system whose components maintain a relative flexibility of interrelations; variation in one aspect of the system may induce compensating changes in other aspects, thus maintaining the integrity of the system (Deutsch, 1968, p. 421).

The biological notion of a self-regulating system has been applied to the psychology of individuals and to the psychology of groups. A model of the individual as a homeostatic system provides the conceptual underpinnings for the theories of Festinger (1957), Hull (1952), Lewin (1946) and Piaget (1975). Similarly, a model of social organization as homeostatic underlies the theories of Heider (1958) and Newcomb (1956). In the present study, the idea is developed that time related aspects of teacher behavior may be interpreted as attempts to establish and maintain an equilibrium between competing demands in the classroom.
General Perspectives or Fundamental Assumptions

It has become fashionable to bemoan the fact that a particular Weltanschauung can have a significant influence upon research. The argument is that a problem formulated from within a particular perspective can yield no further insights than are allowed by the constricting frame of its original formulation. It has been suggested that such conditions make "objective" science impossible (Kuhn, 1962). Similarly, Cohen (1953) rejected the notion of the scientist as detached observer. He argued persuasively that:

if the term scientific method is used in any significant sense it cannot be said to begin with a tabula rasa and pure sense-impressions on it (p. 78).

In Cohen's view, the necessity of collecting the facts which have some bearing on an inquiry, depends upon whether our ideas as to how that which is sought for can possibly be related to what we actually know. Accordingly, basic assumptions about the world and about acquisition of knowledge are not "errors" to be systematically eliminated but important controlling factors in the way in which we view and state problems.

This viewpoint rejects the idea of extreme positivism or "blind" empiricism, untarnished by interpretation. However, the acknowledgement that science can never be truly value free, or completely stripped of interpretive factors, need not licence subjectivity. The recognition that
fundamental assumptions or perspectives have the potential to
influence inquiry carries with it the obligation to elucidate
as far as is possible the principles guiding the research.
Two schools of thought have influenced the conduct of the
present study; the ecological orientation in psychology and
the functionalist approach in sociology.

A fundamental assumption of an ecological orientation
is that behavior arises as a response to environmental
constraints. Willems (1965) argued that an ecological
orientation has two facets, methodological and conceptual.
Conceptually, the environment is regarded as a set of factors
which activate behavior. The methodology of an ecological
orientation follows as a logical consequence of this
principle; ecological psychologists collect data in situ
because the data collected in a controlled experiment may not
reflect behavior in the natural environment.

Whereas the ecological psychologist may be satisfied
with delineating the characteristics of settings which elicit
particular behaviors, the sociologist of a functionalist
persuasion would be inclined to delve further. Functionalism
adopts the posture that phenomena in a social setting serve a
function. The particular stance adopted in the present work
reflects the relative functionalism of Robert Merton (1967).
Accordingly several further assumptions, emanating from
Merton's critique of absolute functionalism, require
attention. It is assumed that behavior is not necessarily
uniformly functional for all participants in a social group,
and neither must all social elements fulfil a function. Further, it is assumed that functional alternatives or substitutes may exist.

The functional approach adopted in the current study assumes that "functions are those observed consequences which make for the adaptation or adjustment of a given system" (Merton, 1967, p. 105). Conversely, it is assumed that behavior may also be dysfunctional or lessen the adaptation or adjustment of the system. Finally, it is assumed that some functions may be recognized and intended by the individuals involved, called manifest functions by Merton, and that other functions are the unintended and unrecognized consequences of the behavior (named latent functions).

The disadvantage of adopting a particular perspective has been acknowledged; the argument that paradigms have a structuring or controlling influence is conceded. However, the existence of fundamental assumptions which guide inquiry need not necessarily be disadvantageous; perspectives need not be judged as "right" or "wrong", but merely more or less useful. This suggests that the value of an ecological orientation and a functional approach in the current work is the extent to which they lend coherence to an understanding of how teachers cope with the problem of individual differences in time needs.
Method of Presentation

It is appropriate at this point to make a few remarks concerning the character of the presentation of this study. The reader is invited to accompany the author on an intellectual exploration of the strategies for coping with individual differences. Intellectual explorations, like geographical ones, have starting points, but only gradually reveal their destination. Presentations of this nature necessarily take on the character of a slowly unfolding story. This style of presentation departs from the convention of apprising the reader of the argument at the outset. The absence of a well-reasoned rationale at the beginning of such narratives demands patience and cooperation from the reader, for he must wait until the end to discover the writer's conclusions. The advantage of this style of presentation is that it permits the reader to follow more closely the development of the writer's thinking.

Several areas of classroom life appeared potentially fruitful to investigate. Grouping for instruction, pace of instruction, time allocation, student time-on-task, and types of activities were identified as areas likely to provide data which might illuminate the problem of differential time needs. Although potential interrelationships between these areas is recognized (for example grouping for instruction may influence time allocation, and type of activity is likely related to student time-on-task), for analytic purposes each area is the focus of a separate chapter. Although the investigation of
each area was conducted simultaneously, in order to enhance coherence, a linear organization has been adopted.

Typically, each chapter opens with a review of the literature pertinent to the area under consideration. The literature review is intended to demonstrate the significance of the topic, and to provide a context for the presentation of the data. Data presentation is followed by a discussion and, in several cases, by the presentation of additional data collected by alternate means. The additional data are included to corroborate, or illuminate further, aspects raised in the discussion. Generally each chapter is concluded with a summary of the major findings and some remarks which are intended to integrate the various themes which emerged in the course of the study.

One of the outcomes of this study was the development of a particular view of classroom processes. The view of classrooms generated from the data collected in this study is presented to the reader through the use of analogies. This style of thinking which recurs throughout this study requires a cautionary note. One of the dangers of utilizing analogies which must be guarded against is the tendency to reification. Accordingly, the reader is cautioned that in the manner described by Kaplan (1964), the analogies and metaphors used throughout this presentation are intended only to direct attention to certain resemblances between the theoretical entities and the real subject matter.
Organization of the Study

The organization of the remainder of the study is as follows. Chapter two opens with a discussion of naturalistic and experimental research and contains details of the design of the study within the naturalistic paradigm.

Chapter three describes how the classes were organized for instruction and proposes that the processes of "leveling and sharpening" (disregarding and responding to the similarities and differences amongst students) influence teacher grouping decisions. The task of the teacher is conceptualized as attempting to establish an equilibrium between the demands of learners who differ in ability or aptitude and a curriculum which must be covered in a limited amount of time. The organization for instruction is interpreted as a strategy to effect this equilibrium.

In chapter four variation in time needed to learn is investigated more closely. In spite of organizational attempts to accommodate differential performance rates, teachers were still faced with the problem of what to do with fast and slow workers. This chapter contains descriptions of the strategies developed by teachers to effect an equilibrium between fast and slow finishers.

In chapter five, pace of instruction is considered as representing opportunity to learn. It is suggested that basic orientations of teachers towards depth of learning (mastery), or breadth of learning (coverage), influence the pace of instruction. It is argued that pace is manipulated by
teachers to balance curricular coverage with meeting the time needs of individual students. It is further suggested that pacing according to the time needs of slower learning children (a mastery orientation) likely results in reduced opportunity to learn for faster learners.

In chapter six, how teachers allocate time to the class, and to the groups within the class, is investigated. The teacher is considered as a utilitarian pragmatist and time allocation decisions are interpreted as functioning to reduce possible management problems. It is suggested that greater allocation of time to slower workers likely reflects a desire to have the majority of students master a limited number of objectives rather than to cover the curriculum at the expense of superficial learning for most of the class. Time used for mastery rather than coverage is interpreted as maintaining an equilibrium between fast and slow workers.

In chapter seven the distinction between allocated time and time-on-task is pursued. It is recognized that the allocation of time to students does not guarantee its wise use. Time on academic tasks and time on non-academic tasks is investigated. The results suggest that although faster learners have higher total on-task rates than slower learners, time on academic tasks is similar for both groups. It is argued that time on academic tasks likely has greater marginal utility for slower learners. It is suggested that similarity between faster and slower students, in on-task rates for academic tasks, may function to maintain an equilibrium.
In chapter eight, the types of activities and assignments given to students are investigated. The thesis is advanced that classroom activities and assignments appear to function to engage the cooperation of the majority of students, and consequently are critical to the maintenance of equilibrium.

In the final chapter it is proposed that the teacher's primary strategy is to keep the class together. This appears to be accomplished by time management with a mastery rather than a coverage orientation. A mastery orientation is seen as likely to reduce the management and instructional problems inherent in increased coverage variance. It is argued that keeping the class together necessarily implies the ignoring or leveling of individual time needs amongst students. Further, how this may contribute to a leveling or decrease in variance of student achievement is discussed.
CHAPTER 2

The Process of Investigation

The purpose of this chapter is to identify and describe the methods and procedures which were adopted for this particular investigation. First, a distinction between two basic modes of inquiry, the experimental and the naturalistic, is made. Criteria for the selection of a mode of inquiry are suggested and reasons for the choice of the naturalistic paradigm are given. This is followed by a section in which the design of the study within the naturalistic research framework is elaborated. Finally, the problems of reactivity and bias, frequently associated with naturalistic studies, are addressed.

Two Paradigms

A distinction may be made between two types of research in education, experimental and naturalistic. Experimental studies are concerned with the manipulation and control of variables:

The experimental method is the one where scientists change conditions in order to observe the consequences of those changes (Shulman, 1981, p. 9).

The aim is the establishment of nomothetic laws. On the other hand, naturalistic studies have as a basic purpose, the observation and description of relationships between variables as they occur spontaneously. Scientists in this mode:
see nature presenting itself for inspection and the role of the scientist that of identifying which of the variations that nature presents are associated with the other processes or outcomes (Shulman, 1981, p. 9).

The aim is to describe functional relationships. Traditionally, the two modes of scientific inquiry have been separated and have pursued independent courses of development (Cronbach, 1957).

Rist (1977) characterized the two types of research as two paradigms fundamentally at variance with one another. Paradigms are used in the Kuhnian sense (1962) of "beliefs, values, techniques, and so on shared by the members of a given community" (p. 175). As such a paradigm is more than a methodology but "predisposes one to view the world, and the events within it, in profoundly different ways" (Rist, 1977, p. 43). Paradigms are seen as having the power to influence how reality is perceived and to dictate how it will be structured.

The general epistemological viewpoints inherent in an experimental or a naturalistic approach to phenomena are radically different. Possibly a major distinction is the way in which the nature of reality is viewed. The experimentalist, also known as the traditional empiricist (Bruyn, 1966), holds as an article of faith that reality is objective and can be appropriately analyzed and measured. Philosophically, this approach is ultimately reductionistic and deterministic. The view of reality held by the naturalistic investigator includes the belief that the knower
cannot be divorced from the known. Reality is inherently subjective and is apprehended through a process of interpretation. These two views of reality give rise to different conceptions of problems and solutions, to different procedures by which reality is investigated, and to different claims to knowledge.

Metaphysical assumptions about the nature of reality produce radically different modes of inquiry. Shulman (1981) argued:

It is important to recognize that differences in method are not merely alternative ways of reaching the same end or answering the same questions (p. 6). He showed how methods are distinguished by the "very types of questions that they tend to raise" (p. 6). Questions within the traditional empiricist mode are stated in the form of logically deduced hypotheses capable in principle of refutation by empirical means. Appropriate canons of methodological rigor involve the reduction of phenomena to variables which can be precisely and reliably quantified. In contrast questions raised within the naturalistic paradigm are stated in the form of inductive generalizations. Appropriate canons of methodological rigor involve the plausibility of the descriptions in the light of our understanding of human behavior, and the internal consistency of the arguments.

It seems clear that paradigms are more than methodological procedures and involve "an interrelated set of assumptions about the social world which are philosophical, ideological and epistemological" (Rist, 1977, p. 43).
Paradigms predispose adherents to view the world through different intellectual spectacles. The adoption of a paradigm entails particular assumptions about the nature of reality and about what constitutes appropriate problems and solutions. Additionally, the two paradigms specify different research procedures. The experimental paradigm is associated with attempts to quantify observations in a precise and reliable way. Adherents of the naturalistic paradigm seek to express functional relationships either numerically, via correlational analysis, or by adopting what has come to be known as a qualitative methodology.

Qualitative methodology refers to those research strategies, such as participant observation, in-depth interviewing, total participation in the activity being investigated, field work etc., which allow the researcher to obtain first-hand knowledge about the empirical social world in question. Qualitative methodology allows the researcher to "get close to the data" thereby developing the analytical, conceptual and categorical components of explanation from the data itself - rather than from the preconceived, rigidly structured, and highly quantified techniques that pigeonhole the empirical social world into the operational definitions that the researcher has constructed (Filstead, 1970, p. 6).

The two approaches are often portrayed as antagonistic (Rist, 1977) instead of equally important and valid approaches to understanding reality (Filstead, 1970).

An Aristotelian perspective dictates that in the face of no single method of inquiry, it is necessary to determine the process of investigation which is appropriate to the topic. The domain of the present inquiry, classrooms, and the particular focus, teacher coping strategies, indicated the
selection of the naturalistic as opposed to the experimental paradigm.

During the late nineteen fifties and the early nineteen sixties, research on teaching was characterized by a growing sense of despair that traditional methods were incapable of advancing knowledge in that field (Bellack and Huebner, 1960). The growing sense of uneasiness in research on teaching may be seen as a reflection of a general malaise surrounding experimental methodology. Dissatisfaction with experimental methodology continued into the seventies (Campbell, 1974; Cronbach, 1975; Glass, 1972; Snow, 1974; Stake, 1978). Cronbach (1975) argued that the search for nomothetic theory was perhaps misguided: the presence of higher-order interactions limits the generalizability of the results of studies. Instead he suggested that "open-eyed, intensive, local observations" (p. 5) will enable the generation of explanatory concepts which will allow social scientists to present a contemporary view of man in society. In short, Cronbach was suggesting that an integral part of research must be the collection of qualitative information along with the more usual quantitative data.

Qualitative research into classroom processes has a considerable tradition. Stevens' (1912) observational analysis of classroom questioning stimulated a series of descriptive studies through the 1920's and 1930's (Hoetker and Ahlbrand, 1969). This trend to qualitative research was eventually surplanted by more quantitative investigations into
teacher effectiveness (Dunkin and Biddle, 1974). During the late nineteen sixties, there was a resurgence of a qualitative approach to inquiry into educational phenomena (Jackson, 1968; Smith and Geoffrey, 1968). This trend to qualitative analysis continued into the nineteen seventies (Bossert, 1979; Lortie, 1975), and has been labelled ethnographic or naturalistic research. A major characteristic of this research is the adoption of methodologies from the fields of anthropology and sociology (Lutz and Ramsay, 1974; Overhalt and Stallings, 1976). Emphasis is placed upon direct observation, and the contributions of participants via interview.

Research on teaching has been characterized as in its infancy (Brophy, 1979; Dunkin and Biddle, 1974). It has been suggested that observation and description of phenomena are prerequisites to the development of hypotheses which may be tested statistically (Kaplan, 1964). Information regarding classroom processes is limited. Therefore, it is proposed to investigate the strategies developed to accommodate variation in performance or working rates within the naturalistic framework.

**Issues of Design in Naturalistic Studies**

Within the experimental paradigm to talk of the "design" of the study usually refers to the elaborate planning that takes place prior to the conduct of an experiment. Usually "design" refers to the selection or generation of data gathering instruments to secure information relevant to the
hypotheses under consideration, as well as to the means by which the data will be gathered and subsequently analyzed. The emphasis within the experimental paradigm on the testing of hypotheses, permits the design of the study to be specified a priori. In contrast to the experimental approach, within the naturalistic paradigm, design is used in a less restrictive way to connote "those elements of order, system and consistency" (Becker, Geer, Hughes and Strauss, 1961, p. 17) exhibited by a study. The emphasis within the naturalistic paradigm on the description of phenomena, and on the development of hypotheses from a data base, precludes the complete specification of the design prior to the fieldwork.

Research within the hypothetico-deductive model sets out to test specific predictions from extant theoretical propositions. The genesis of such research is typically a review of the relevant literature. Research within the naturalistic paradigm sets out to explore naturally occurring relationships, and to generate theoretical propositions from the data collected. The genesis of such research may be a practical problem such as the concern over the quality and performance of those who apply and are admitted to colleges and the professional schools (Becker et al., 1961); the lack of investigation of an area as exemplified by Bossert's (1979) study of the influence of the structure of activities on the behavior of students and teachers; or a critical incident such as experienced by Jackson (1968) when he observed the amount of waiting in elementary classrooms. The genesis of the
current study was the observation that children differed in the amount of time they needed to complete assignments. Reflection on the practical problems occasioned for the teacher by the existence of fast and slow workers within classrooms led to speculations about how the time needs of students might be related to the distribution of time for learning within classrooms.

The inability to specify the complete design of a study conducted within the naturalistic framework prior to the start of fieldwork should not imply that such investigations proceed in an ad hoc fashion. Shavelson (1981) stated that:

fieldwork methods (e.g., participant observation, focused interviewing) and analytic techniques (e.g., development of conceptual and categorical systems from the data themselves) have been developed by qualitative researchers and have their canons of methodological rigor just as quantitative methods do (p. 459).

Neither does it imply that the researcher within the naturalistic paradigm approaches the investigation with a "tabula rasa". Glaser and Strauss (1967) suggested that the researcher may begin with:

a partial framework of "local" concepts, designating a few principles or gross features of the structure and processes in the situations that he will study (p. 45).

Cicourel (1964) pointed out the dynamic nature of naturalistic studies:
Rather than entering the research setting with an explicit theoretical scheme and design, the field researcher frequently develops his "theory" during the study or after the data have been collected and while writing up the findings (p. 71).

This form of research has been described as:

intentionally unstructured in its research design so as to maximize discovery and description rather than systematic theory testing (McCall and Simmons, 1969, preface).

Becker et al., (1961) suggested that the researcher has an original view of the problem (which may not be the view at the end of the research) as well as theoretical and methodological commitments. They suggested that these form the framework of the study and as such should be elaborated as aspects of the "design".

The original view of the problem was that time in school was a limited resource but that children differed in the amount of time they required for learning. It was anticipated that this fact of classroom life would elicit varying responses from teachers and that these responses might best be interpreted as coping strategies. The purpose of the research was to identify and describe possible coping strategies. During the course of the study the idea of equilibrium as an explanation of coping strategies was developed. The conceptualization of the teacher as rationally attempting to optimize student learning was rejected as inadequate to explain the data collected. Rather the idea of the teacher as a utilitarian pragmatist was adopted as a more adequate explanation of classroom processes.

The emphasis on time related issues suggested the basic
theoretical framework. The idea of time as a resource has a long tradition in education (see chapter six for an historical review), but it is only recently that the ramifications of such a view have been systematically examined using models from economics. The use of an analogy from economics is amply supported by the extent to which past and present research literature on time in schools employs, implicitly or explicitly, economic models. Additional justification of the theoretical framework was considered to be provided by the practical advantage of considering time as a resource (discussed in chapter one).

Theoretical commitments are not always detached from methodological commitments. Witness as evidence the tendency of researchers using an economic model to adopt regression procedures (Shulman and Epstein, 1975). In the current investigation the adoption of a methodological orientation led to the utilization of a particular theoretical perspective. An initial predisposition was to treat the classroom as a social organism. The adoption of a social-psychological approach entailed a belief that all behavior serves some function. This "structural-functional" approach led to the development of the idea that the manifest function of teaching was enhancement of learning, but that the latent function was student cooperation to enhance teacher utilities.

The decision to treat time as a resource, and to adopt a social-psychological approach to classroom events, provided an initial framework for the study, delineated areas of
possibly fruitful investigation, and suggested a pool of concepts and principles which might be used. Areas selected for study were selected because the literature indicated their significance (time-on-task and pace), because of some puzzling feature which was thought might be related to the problem (discrepancies among classrooms in allocated time), or because they seemed logically related in some way (activities and organization for instruction). It is important to stress that in the initial stages the general theoretical assumptions and methodological orientation guided, but did not dictate, the objects of study. In other words, while it was anticipated that there might be some interrelationships between the areas selected for study, the precise nature was not hypothesized prior to the fieldwork.

The view of the classroom as a social system also suggested a particular style of analysis. Although facets of classroom life were separated analytically for study, the view of the classroom as a social system indicates an interest in discovering relationships between many kinds of phenomena and events considered simultaneously. The analysis was aimed at interpreting classroom events with the express purpose of developing tentative generalizations which could serve as explanatory frameworks. Accordingly, the analysis concentrated on abstracting recurring elements or patterns from the concrete details of events.

The attempt to generate explanatory frameworks from a data base led to the adoption of participant observation as
the major method of investigation. Participant observation has been described as:

not a single method but rather a characteristic style of research which makes use of a number of methods and techniques—observation, informant interviewing, document analysis, respondent interviewing and participation with self-analysis (McCall and Simmons, 1969. Preface).

Participant observation involves the researcher participating:

in the daily life of the people under study either openly, in the role of researcher, or covertly, in some disguised role, observing things that happen, listening to what is said and questioning people over some length of time (Becker et al., 1961, p. 23).

In this study the investigator participated openly as a researcher. Because of the nature of the organization under investigation, classrooms for young children, the researcher was passive during classroom observation but assumed a more active role, interacting with teachers only during non class times (recess, noon hour, before and after school).

The Design of the Study

A decision was made to study a small number of classrooms. This decision to concentrate energy on a small number of classrooms was governed by both conceptual and pragmatic considerations. Brophy (1979) called for a moratorium on large studies involving relatively little observation in numerous classrooms. Instead, he suggested that it might be more profitable to spend a greater amount of time observing in fewer classrooms. Five classrooms were considered so that each might be visited on a weekly basis.
This enabled a single investigator to spend a considerable portion of the day visiting the schools, but still provided some time at the end of each observation period to reflect on the notes taken, and to begin the process of analysis and synthesis.

The five grade three classrooms were visited once a week during a three month period in the fall of 1980. The schools were situated in the lower mainland of British Columbia in a predominantly urban area. The selection of schools was made by school district personnel using guidelines suggested by the author. The study was planned as five case studies. Homogeneity amongst the cases was sought to control extraneous factors and thereby reduce the possibility of confounding. Accordingly, the cooperation of five female teachers who had a minimum of five years of experience was sought. Females were chosen because traditionally the primary grades have been dominated by women. Teachers who had had a minimum of five years experience were sought so that basic classroom management skills would be well established. Because of the duration of the study, only teachers who indicated a desire to cooperate were sought.

School district personnel selected the schools for their demonstrated willingness to cooperate with university researchers. Principals had to give their consent before the teachers could be approached. All of the principals expressed interest in the project, but left the decision to participate to the individual teachers. The grade three teachers in the
chosen schools gave their consent to being involved.

Random sampling of teachers was not feasible for the present study. In the experimental tradition random sampling is considered desirable in order to generalize results. The failure of educational studies to meet the assumption of random sampling necessary for statistical inference has been discussed extensively (Bracht and Glass, 1968; Cornfield and Tukey, 1956; Cronbach, 1975). Snow (1974) suggested that the key to generalization is to describe the sample population in detail. Accordingly, the five schools, children, teachers and classrooms are described in detail in Appendix 1.

Data Collection

Within the naturalistic framework:

Data collection is not a distinct phase in the research process but rather is one analytically distinguishable aspect of a multiplex process. Design, analysis and write-ups are also being carried out simultaneously with data collection and all four aspects continually influence and impinge upon one another (McCall and Simmons, 1969, p. 61).

Accordingly, it should be borne in mind that the subheadings used for this section, and for the following section, are used for analytic purposes, and are not intended to convey the impression that distinct phases were followed during the execution of the study.

The data collected fell naturally into two categories, structured and unstructured. Some of the data collected during the study were structured, in the sense that the investigator knew what data to collect, and how to collect it, prior to collection. Such structured data (on-task rates and
student performance on an arithmetic task) were collected in accordance with traditional standards for quantitative data. (In order to maintain continuity and coherence precise details of the collection and analysis of quantitative data will be given in context). Other data were unstructured, in the sense that the investigator did not know prior to collection, the precise nature or form of the data nor how they were related specifically to the problem under investigation. Unstructured data were collected by means of narrative specimen records of the observation of classroom events and informal talks with teachers. The use of the term "unstructured" should not be construed as implying the data so collected are lacking in methodological rigor. As pointed out by Shavelson and Stern (1981), Shulman (1981), and Wilson (1977), qualitative research is much like quantitative research, in that it has a long tradition within which investigators are working continually to refine and develop effective and appropriate research methods.

**Narrative specimen records.** The narrative specimen record (Barker and Wright, 1955; Gump, 1969; Wright, Gump, Nall, and Schoggen, 1955) is a naturalistic description of a stream of events (see Appendix 2 for an example). As Becker et al., (1961) have commented, it is neither possible nor particularly useful to record every event. Therefore, it is important to signify what was included and what was omitted in the descriptions. In the present study a record of the salient features of classroom life which might be associated
with time use was required. Consequently, the beginnings and ends of lessons, the subject matter studied, the assignments given to students, and whether instruction was to the class or a group, were recorded. Additionally, teacher comments to students about work, how long they had, and directions about what to do when finished, were noted. Other aspects of classroom life were neglected, particularly interactions among students, because they were not considered of significance to the problem studied.

Informal interviews. Informal interviewing of the teachers took place on an on-going basis. In one sense, the use of the word "interview" may be a misnomer, for the interactions were in the form of conversations. Information on a variety of topics was gathered during the course of conversing with the teachers at recesses and lunch hours. Although unstructured, and following the conventions of dialogue, the conversations were not haphazard. Typically, the investigator took advantage of a classroom event to open a conversation on a topic of research interest. The topics covered during a particular conversation were dictated by the circumstances of the moment and the interests of the investigator. The flexibility of the conversational mode permitted follow-up of the spontaneous remarks of the teachers. Replies to queries often prompted additional questions. Questions which elicited fruitful responses from one teacher were subsequently incorporated in conversations with the other teachers.
During the course of the research a list of the questions relating to the problem was generated (see Appendix 3). Not all of these questions were asked of all of the teachers as some questions obviously did not apply in some of the classrooms, or the answer was apparent from observation. Neither were all asked in the same manner, or in the same sequence. The advantages of the conversational mode, spontaneity and naturalness, were judged to outweigh the disadvantage of lack of standardization in the question-asking procedures.

To maintain the conversational mode no notes were taken during the dialogue. A review of the main topics was recorded as soon as was convenient at the end of each conversation. The major disadvantage of this approach is, of course, the reliance on memory. However, the lack of inhibition, typical of spontaneous comments during conversation, was deemed to be adequate compensation for the lack of precision.

Data reduction

The method of participant observation generates a considerable amount of data. Consequently, a major practical problem becomes one of data reduction. During the course of this study, and following Smith and Geoffrey (1968), the field notes were read at the end of each day and a written record of impressions and ideas was made (see Appendix 4). This record constituted a summary of the observations made that day and also contained tentative interpretations. This phase of the research process might be characterized as reflection on the
observations of the day with a view to making sense out of them. Reflection was carried out in a deliberate way, using the method of constant comparison (Glaser and Strauss, 1967). Incidents and events of the day were compared in a search for similarities. Events which were similar were considered to belong to a particular category. Subsequently, other incidents and events, which were considered candidates for membership in the category, were compared with events already in the category. As the research progressed, commonalities within classes and across classes began to emerge; these patterns were identified and labeled. At the end of the fieldwork, these summaries of the daily observations provided the major concepts and themes which were used to develop the idea of equilibrium as the basic coping strategy. A major difficulty with qualitative analysis of this sort is that it is impossible to record the amount of data necessary to justify conclusions in a brief, convenient way. Typically characteristic illustrations of concepts or principles are reported (Glaser and Strauss, 1967).

The Problem of Bias

There appears to be general agreement that observation poses problems concerning the reliability and the validity of the data collected (Becker et al., 1961; Bruyn, 1966; Cicourel, 1964; Kerlinger, 1964; Schwartz and Schwartz, 1969; Viditch, 1966; Zelditch, 1969). McCall (1969) suggested that the principal concerns regarding observational data were: 1)
the reactive effects of the presence or the behavior of the observer on the phenomenon under investigation; 2) the distorting effects of selective perception and interpretation on the part of the observer and; 3) the limitations on the observer's ability to witness all relevant aspects of the phenomena in question. In McCall's paper (1969) the concern regarding limitations on the ability of the observer to witness all relevant aspects stemmed from the observer's position within the organization and what access to information this might have denied him. Organizational constraints on information were not a feature of the present study. In this study, the limitations were occasioned by the impossibility of accurately witnessing all classroom events because some of them occurred simultaneously. Fundamentally a problem of perception, this is discussed under the concern for distorting effects. Reactive effects are discussed first, followed by a discussion of the distorting effects of selective perception and interpretation.

Reactivity and Observational Measures

There seems to be general agreement that observers do affect behavior (Barker and Wright, 1955; Campbell and Stanley, 1963; Cook and Reichardt, 1979; Webb, Campbell, Schwartz, and Sechrest, 1956). However, Weick (1968) argued that the real issues are how extensive the impact is, which settings and processes are most vulnerable to its effects, and whether interference can be detected. He suggested that observer effects may be localized and that they should be
documented. An extreme position that even loss of initial awareness is no guarantee of uncontaminated behavior, has been taken by several researchers (Orne, 1962; Rosenthal, 1964; Sherif and Sherif, 1964). Researchers who take a more moderate position argue that a period of adaptation or habituation to the observation procedure is necessary to deal with the problem of reactivity (Purcell and Brady, 1966; Soskin and John, 1963).

Purcell and Brady (1966) and Soskin and John (1963) suggested that subjects readily become accustomed to invasion of their privacy. Soskin and John (1963) studied the verbal interaction of two sets of married couples via radio transmitters which were worn daily for a period of two weeks. The subjects reported diminished awareness of the apparatus during periods of intense involvement. Purcell and Brady (1966) similarly studied the behavior of adolescents who wore "live" and "dummy" transmitters for one hour each evening. The percentage of remarks regarding the study dropped considerably after the first two sessions. Independent observers who were familiar to the adolescents, but who were naive as to which adolescents wore the live or the dummy transmitters, failed to report significant differences between behavior under the two conditions. It seems reasonable to suggest that the use of transmitters is potentially as threatening as a live observer; recordings of the most intimate verbal interactions can be made and with greater fidelity than by a live observer. Yet even in these studies
behavior, either rated objectively or subjectively, did not appear to be influenced significantly.

Doyle (1979) argued that teacher behavior in the classroom is a functional response to that particular environment. If this is so, then changes in an habitual pattern of behavior are likely brought about only by a major disruptive event. It seems unlikely that knowledge of being observed could have enough impact to constitute a force disruptive enough to radically alter behavior. Classroom performances of both teachers and students are public events. Teachers and students, by reason of their exposure to each other, have expectations of what behaviors will occur. Consequently, one would expect that pronounced reactivity effects would lead to a modification of the usual interactions between teachers and students. It was anticipated that behavior which deviated from the usual would be the cause of expression of concern by either party. For example, a class which is usually quiet but suddenly becomes noisy, will likely draw forth teacher remonstrations. Similarly, unusual teacher directions are likely to be met by student puzzlement, evidenced by increased question asking.

The research reviewed suggested that reactive effects diminish over time. During the first observation in each room the children were told that the "visitor" was interested in learning about grade three classes. At the recess break one or two children expressed interest in the "numbers" the observer was recording on the coding sheet. During subsequent
visits children rarely approached the observer and only once during class time did a teacher refer publically to the fact that the class was being observed. At the beginning of the study, all of the teachers thought that an observer in the room would not disrupt the class as the children were used to visitors being in the room. Towards the end of the study, one teacher spontaneously commented on the way her class had ignored the observer:

It's as if you're part of the woodwork. Even B. (the child in the desk directly in front of the observer) hasn't been squirming around to bother you.

Consequently, it is concluded that reactive effects were probably minimal.

Selective Perception and Interpretation

A second principle concern expressed about observational studies is that the observations may be distorted by the selective perceptions and interpretations of the observer. Implicit in the concept of distortion is the assumption that "objective" reality exists and can be assessed independently of an observer. The notion is that perception must be stripped of all conceptual contamination in order for the observation to reflect "reality". Only under these circumstances are data considered to be "objective" and hence "scientific".

An equally tenable position is that science is a socially embedded activity carried out by human beings who are
heirs to some intellectual preferences and viewpoints. Within this formulation all observations, whether quantitative or qualitative, are the product of interpretation because they have been filtered through the mind of the observer. According to Claude Bernard (1865), quoted by Black (1954):

> pure observation is a myth. What shall count as a fact in any well-developed science is already largely determined by theory embodied in the disposition of scientific instruments, the selection of "competent" scientists, and the posture of "correct" observation (p. 19).

Philosophers of science have argued that science is not, and cannot be, value free (Black, 1954; Kaplan, 1964; Kuhn, 1962; Scriven, 1972; Toulmin, 1961). Typically, observations which lend themselves to quantification have enjoyed greater respectability as "objective" and have been considered to be free of distorting effects. Gould (1981) demonstrated that quantification of observation is open to interpretation. In his reanalysis of what were considered to be impeccable data sets, he showed how a priori assumptions influenced, at an unconscious level, the data collected by scientists who were considered to be amongst the most eminent and objective of their time.

Gould (1981) demonstrated that quantification of observations is no guarantee of objectivity. His reanalysis is a cogent demonstration of an interesting distinction between objectivity and subjectivity made by Scriven (1972). Scriven argued that objectivity and subjectivity are held to be contrasting but that they are widely used to refer to two
different contrasts:

In the first of these contrasts "subjectivity" refers to what concerns or occurs to the individual subject and his experiences, qualities and dispositions while "objective" refers to what a number of subjects or judges experience—in short, to phenomena in the public domain (p. 95).

He suggested that as the difference is in the number of people to whom reference is made this contrast is quantitative.

Scriven continued:

In the second of the two uses, there is reference to the quality of the testimony or the report or the (putative) evidence, and so I call this the "qualitative" sense. Here "subjective" means unreliable, biased or probably biased, a matter of opinion, and "objective" means reliable, factual, confirmable or confirmed and so forth (p. 95).

He maintained that a fundamental confusion in social science research is to fuse the two meanings such that reports by a number of people become objective, and reports by one person, subjective. Scriven argued that reports by one person need not be necessarily subjective in the qualitative sense. He suggested that the acid test is the test of the credible witness:

If we can test someone's claims on a very large number of occasions and find them extremely reliable, we have good reason to believe him on other occasions when he testifies about events of a kind that we know to exist even though we cannot check them directly ourselves (p. 96)

Typically, reports of research include a review of the pertinent literature, as well as a presentation of data, results, and conclusions. In the case of studies conducted by a participant observer, where the credibility of the fieldwork cannot be assessed directly, Scriven's argument would suggests
that credibility may be estimated based upon claims made about the literature which is accessible to all. In addition data reported by a participant observer, which are corroborated by other researchers in the area, have a higher probability of being free from distorting effects. Finally, in discussing the adequacy of naturalistic research, it seems appropriate to point out that the end product of any scientific investigation is not acceptance or rejection of propositions, but the degree of confidence that one can place in the propositions (Rozeboom, 1960). Ultimately confidence in a set of propositions is a product of judgement. McCall (1969) advised that judgement of a naturalistic study should include an evaluation of whether the account is plausible in commonsense terms. Bruyn (1966), Cronbach and Suppes (1969) and Shulman (1981) advised that confidence in a report should be based on an evaluation of the coherence and internal consistency of the arguments presented.

**Generalizability**

Science is more concerned with the universal than the particular. This preference reveals itself in the concept of generalizability. The question asked is to what degree the findings from one context may be assumed to apply in other settings or under other conditions. Attention is typically addressed to generalizability from the particular sample of subjects to some larger universe of subjects of which they are said to be representative. In this particular study, one might ask how far the conclusions drawn from the five
classrooms investigated apply to other classrooms. Because of the small number of classes involved, and the lack of random sampling, no unwarranted claims to generalizability are made; but neither are the results intended to reflect the idiosyncrasies of individual teachers. William Blake wrote of "worlds in a grain of sand". In so much that the world of one classroom shares a similarity with the world of other classrooms, it might reasonably be anticipated that the study of a few classrooms might shed light on some processes which are common to all. How common are the processes that were revealed in the present investigation is a judgement that may be made by the reader. In order to facilitate this judgement, the classrooms are described in detail in Appendix 1.

Although the universality of specific conclusions is an important question, perhaps a more important issue is the question of the generalizability of the concepts and principles generated during the course of a naturalistic investigation. Kaplan (1964) argued that the most basic of all generalizations are identifications, by which he means "the making of enduring or recurrent constituents in the flow of experience" (p. 85). Typically, these generalizations become the concepts used to describe reality. Glaser and Strauss (1967) suggested that naturalistic research involves the generation of conceptual categories from data. Once generated the conceptual categories have a life of their own. Further, they maintained that the accuracy of the evidence used to generate the concept is not fundamentally problematic,
because "the concept itself will not change, while even the most accurate facts change" (p. 23). Therefore, one might argue that the most appropriate question to be addressed by naturalistic studies is the generalizability of the concepts and principles generated.

This chapter was concerned with the description of the methods and procedures adopted during the present study. Because the investigation was conducted within the framework of the naturalistic paradigm, an effort was made to emphasize the dynamic nature of the design of the study: hypothesis generation as opposed to hypothesis testing results in a process of investigation rather than a research design specified a priori. The observational nature of the research required that two major aspects of the problem of bias, reactivity and distorting effects, be addressed. Finally, the question of the generalizability of the results of naturalistic research was discussed.
CHAPTER 3

Organization for Instruction: Leveling and Sharpening

A fundamental difficulty faced by many organizations is the necessity of dealing with the diverse needs of clients. Often organizations respond to diversity by creating subgroups (Rosenbaum, 1980). The magnitude of the educational enterprise dictates that learners must be organized into groups of a convenient size. While the necessity for some system for organizing large numbers of learners into groups is apparent the means by which this may best be accomplished has long been the subject of debate; Shane (1960) documents thirty two methods for grouping which have been tried. The problem of selecting the most appropriate method of organization has been complicated further by the existence of individual differences amongst learners. Even a cursory glance at the profuse literature on the organizational responses to the problem of individual differences provides ample justification for the dictum:

No scheme of school organization however elaborately worked out, provides for the types and ranges of learner variability encompassed by the school (Goodlad, 1962, p. 210).

Shane (1962) noted four basic trends in the organizational responses to individual differences. He argued that grade levels were introduced in the mid-nineteenth century to reduce the individual differences found in the nongraded schools. He pointed out that in an attempt to make
the graded approach less arbitrary "multiple track" plans were introduced permitting students to progress at different rates (see discussion in chapter one). He identified the movement towards homogeneous grouping as an attempt to organize pupils by ability. Finally, he noted the trend towards ungraded grouping in the early elementary years.

It is perhaps not an unfair comment that the impetus to change the organizational structure of the schools has received its force from a belief not only that change was desirable on philosophical or social grounds, but also that an organizational solution could be found to the problem of individual differences. This view seems unduly optimistic in the light of Shane's review (1960) of the number of different methods of organization. It seems reasonable to question if a completely desirable solution exists. In chapter one, it was argued that teachers face a fundamental dilemma: they have to ensure that groups of learners who differ in time needs cover a common curriculum in a limited amount of time. If teachers organize classes so that the needs of individuals are met, it seems likely that there will not be enough time to cover the curriculum. Conversely, if they organize for instruction to ensure that the class covers the curriculum, they likely run the risk of not allowing enough time for individual students to complete the work. The purpose of this chapter is to explore to what extent organization for instruction in the five classrooms represents a resolution of this fundamental dilemma of individual differences in time needs.
The exploration begins with an examination of a major form of organization for instruction, grouping. Consequently, the chapter opens with a review of the literature on this topic. This is followed by a description of how the five classes were organized. On the basis of these observations, it is argued that the accommodation of individual differences is a philosophical ideal which is at variance with the collective nature of classroom life: teachers may be philosophically inclined to individualism, but the reality of their daily work commits them to deal with learners en masse. This analysis prompts the conclusion that the organization for instruction may serve a purpose other than maximizing the achievement of individuals. Consequently, the final part of the chapter offers an alternative interpretation of the function of organization in classrooms. It is argued that organization for instruction functions to effect a compromise between the demands of students with differing time needs and the necessity of covering a common curriculum in a limited amount of time.

Selection of Children for Instruction

It is appropriate to begin with a discussion of how children are selected for instruction. Both Thelen (1959) and Yates (1966) have noted that selection for instruction is controlled by several factors: these might be labeled sociological, administrative and instructional. The initial selection of who will be educated is a function of society.
Thelen (1959) noted that initially age, and later socioeconomic factors, delineate the pool of learners. A second point of selection, still sociological in nature, is the schools which the students will attend. The third level of selection involves an administrative decision about assignment of learners to classes within the school. And finally, the fourth level of selection involves decisions regarding the within class subgroups to which students will belong for the purpose of instruction. It is this fourth level of selection, intraclass grouping, potentially under the control of the teacher, which is the concern of the present chapter.

**Intraclass Grouping**

In reviewing the literature on the organization of learners for instruction, it readily becomes apparent that some of the points of selection have generated considerable discussion, while the others appear to have commanded little interest. The age of entry into school fluctuates between different countries but within each society there appears to be some consensus about what constitutes the appropriate population of learners. In the United States the issue of desegregation and busing have highlighted a controversy over the second point of selection. In both North America and Europe the third point of selection, assignment to classes, has generated a prolonged and sometimes heated debate between the proponents of homogeneous and heterogeneous ability grouping. In contrast to decisions about which schools and
classes children will attend, within class organization has been subjected to little scrutiny. Heathers (1969) in a review article on grouping comments:

The mere handful of studies on intraclass provisions for meeting differences among learners contrasts sharply with the large volume of research on interclass grouping (p. 567).

The interschool and interclass degrouping debates have emphasized the social and psychological impact of group membership on individuals: hence the lack of attention to within class grouping is particularly curious.

Heather's (1969) comment regarding the contrast between the large volume of research on interclass grouping and the dearth of information on intraclass grouping should not lead one to assume that the educational literature is silent on this topic. On the contrary, a body of literature on intraclass grouping does exist, but it is hortatory rather than empirical in nature. The assumption that grouping is a good thing is a pervasive theme underlying much of this work, but there has been little attempt to document either the positive or the negative effects of this practice. The paucity of attempts to validate this commonly held notion is further surprising in view of the widespread nature of grouping. Heathers (1969) refers to a National Educational Association Report of 1962 in which elementary principals reported the existence of subgroups in four fifths of their classes for reading and two thirds of their classes in arithmetic. The ubiquity of the practice would seem to provide adequate reason to attempt to substantiate the
prevailing myths about grouping.

**Myths About Grouping**

The Webster's New Collegiate Dictionary (1979) defines myth in four ways:

1: a usu. traditional story of ostensibly historical events that serves to unfold part of the world view of a people or explain a practice, belief or natural phenomenon 2: parable, allegory 3 a : a person or thing having only an imaginary or unverifiable existence b: an ill-founded belief held uncritically esp. by an interested group 4: the whole body of myths.

Myth, in connection with intraclass grouping, is used in the sense of 3b and is intended to convey the notion that much of the writing on the subject reflects beliefs which have not been subjected to empirical scrutiny.

There appear to be four dominant myths surrounding the notion of intraclass grouping. Two of the myths relate to the advantages accruing to learners; the myth of providing for differences and the myth of individualization. The remaining myths concentrate on the advantages for teachers; the myth of easing the problem of instruction and the myth of narrowing the range.

**Myth One: Providing for Differences**

Hook (1960) articulated the reason for grouping at the class level: "we group in order to provide for the vast differences that exist amongst any aggregation of individuals" (p. 421). How grouping provides for individual differences is not clearly specified. One would anticipate that in order to
provide for individual differences there would be qualitative
differences in the kinds of instruction for each group.
Rosenbaum (1980) noted that the ability grouping literature
commonly assumes that teachers differentiate instruction, and
commented on the lack of explicit discussion regarding the
teaching methods that are most appropriate for different
levels.

Myth Two: Individualization

Implicit in myth one is the recognition that
differences between individuals exist and that the teacher has
an obligation to provide for them: myth two specifies how this
may be accomplished. Anderson (1962) assumed that teachers
have subgroups "for the purposes of fostering individualized
learning opportunities" (p. 251). Anderson suggested that the
genesis of the desire for individualized learning
opportunities is the cultural expectation that each child will
receive individual attention. Presumably the desire for
individual attention results from a belief that this will
enhance learning. The question naturally arises as to how far
grouping leads to the enhancement of learning. Yates (1966)
summarized a large body of research and suggested that
grouping by ability into homogeneous and heterogeneous classes
does not enhance achievement. Yet in a recent review
Rosenbaum (1980) argued that the results are contradictory.
He adopted an accounting procedure to show the contradictory
nature of the results of the fifty best controlled studies
published between 1960 and 1968.
The reviews by Yates (1966) and Rosenbaum (1980) are largely concerned with intraschool organization of children into classes by ability. Wallen and Vowles (1960) in a study contrasting grouping and no grouping within the same classes found no effect of grouping on achievement. In spite of the contradictory evidence on interclass grouping, and the limited evidence regarding the effects of intraclass grouping, the division of children into subgroups appears to be a dominant organizational pattern. Yates' (1966) comment that within the educational community there is considerable conservatism regarding changes in organizational practice seems justified.

**Myth Three: Easing the Problem of Instruction**

Myth three provides a rationalization of grouping which emphasizes the advantages to the teacher. Wilhelms and Westby-Gibson (1960) suggested "Teachers have tended to see grouping as somewhat easing their problem of instruction"; they add, rather cryptically in view of their lack of elaboration, "a perception not to be taken lightly" (p. 411). The notion of grouping as an instructional strategy is implicit in their writing, but is not developed. Questions of when it is used, and with what effectiveness, do not appear to have been addressed. Neither do Wilhelms and Westby-Gibson specify how grouping "eases" the problem of instruction.

**Myth Four: Narrowing the Range**

In the larger debate concerning the assignment of children to classes, the argument used for homogeneous
grouping was that it narrowed the range of ability with which teachers had to deal (Heathers, 1969). Wilhelms and Westby-Gibson (1960) commented that teachers desired the narrowing of range presumably because the reduction of the range was seen as facilitating teaching and learning. If interclass grouping reduces the range then a logical extension of the argument would predict even greater homogeneity with intraclass grouping.

The assumption of homogeneity has been questioned (Clarke, 1958; Eash, 1961; Goodlad and Anderson, 1959; Tyler, 1965; Wilhelms and Westby-Gibson, 1960). Grouping children appears not to reduce the variability appreciably. Petty (1953) reported a wide range in both ability and achievement in intraclass groups. Clarke (1958) found that regrouping children on the basis of IQ scores reduced variability in the California Reading test scores by 9% and in arithmetic and language by 2%. Students may become more similar on the chosen factor but remain quite heterogeneous on other factors. Even when grouping is carried out specifically in a subject area, the reduction in variation is likely not to be great. In the Clarke study (1958) grouping by reading scores reduced the variability by 20%. Goodlad and Anderson (1959) commented:

The more we divide general development into specific traits, the easier it is to group pupils homogeneously on a single trait but the harder it becomes to group them homogeneously on all traits (p. 18).
They rejected homogeneous grouping as a "will o'the wisp", and concluded that it did not adequately address the problem of individual differences in learning.

**Grouping Decisions**

In spite of the fact that the presumed advantages for both teachers and pupils have not been consistently demonstrated, there exists a substantial literature which exhorts teachers to group; Alexander (1979) and Smith and Johnson (1976) provide typical examples. Much prescriptive advice on how to group prevails but little attention has been paid to describing how teachers make grouping decisions. Several writers have suggested factors which may influence grouping. Yates (1966) suggested that groups may be formed on the basis of such criteria as intelligence, aptitude, achievement, special needs, interest and motivation. Alternately, Anderson (1962) suggested that grouping decisions are governed by essentially pragmatic considerations; the nature and the amount of physical instructional resources available. He appeared to interpret resources in material terms, portable furniture, textbooks, materials and space within the school building.

On the other hand Barr (1975) and Heathers (1969) see psychological rather than physical factors as paramount. Heathers suggested that intraclass grouping is more likely to occur in heterogeneous classes than in ability grouped classes since he believed that teachers employ grouping to accomplish within class ability or achievement level grouping. Barr
(1975) is more specific. She reported that grade one teachers grouped when they found that some pupils differed sufficiently from others in their ability or attention, so that managing total-class instruction with the same materials became difficult. Further, she suggested that grouping occurred in response to two types of learners who were perceived by the teachers to be atypical; children who had difficulty attending to instruction, and extremely good learners who were eager to move ahead and became restless if they did not.

Although the literature on intraclass grouping is meager it contains some interesting speculations. It has been suggested that teachers group in response to pupil characteristics, mainly ability and attention, and that the range of variability within a class will influence teacher grouping decisions. Apart from Anderson's (1962) suggestion that grouping is also influenced by the availability of resources, the possibility of other constraints on grouping appear not to have been generally considered. One possible constraint that springs to mind is the pragmatic one of classroom management. Grouping for instruction reduces the time the teacher spends with the whole class and necessarily increases the time that students must work independently. This pattern of organization involves decisions about how time should be apportioned to groups, and how children working independently are to be managed. How time elements and teacher management skills may influence organizational decisions appear not to have been investigated.
One interesting facet of grouping for instruction is the extent to which this ubiquitous practice continues in the face of evidence which questions its effectiveness. This tendency to adhere to old forms of organization has been described as conservative (Yates, 1966); however, an alternative view is that the practice of intraclass grouping may serve some purpose. It seems appropriate at this point, to reintroduce a distinction between the recognized and intended consequences of behavior and the unrecognized and unintended consequences. In the sociological literature, the former are called manifest functions and the latter latent functions (Merton, 1967). It has typically been supposed that teachers group to accommodate individual differences with a view to maximizing student learning; this may be described as the manifest function of grouping. Therefore, an initial question is to what extent does grouping facilitate the accommodation of individual differences. Within the boundaries of this study the question is rephrased to ask to what extent does grouping alleviates the problem of differential time needs? Additionally, in the face of evidence which suggests that the manifest function of grouping, the accommodation of individual differences, is questionable, it seems reasonable to investigate if a latent function exists.
Within Class Variation in Ability

It has been suggested that within class heterogeneity may be a catalyst for grouping (Barr, 1975; Heathers, 1969). Accordingly, information regarding the variability in the classes selected for study is presented, prior to a description of how they were organized for instruction.

In keeping with the naturalistic emphasis of the study, it was decided to capitalize on the information already available. All of the teachers had access to achievement test results: some of the results were from the previous year, but four of the teachers administered tests during September as an aid to grouping. Teacher 4 and Teacher 5 gave the Gates MacGinitie reading test, Primary C, form 1 (Table 1) and an Initial Placement test, Ginn, 1976 (Table 2). Teacher 3 gave only the Gates while Teacher 1 gave only the Ginn. The results of the Gates MacGinitie (Primary B, form 1) administered at the end of grade two were also available for Teacher 1's class. As this teacher gave no tests in September the results of the Gates given at the beginning of grade two will be reported as an indication of the range of reading achievement in her class. None of the teachers reported giving any tests in arithmetic.
## Table 1

**Gates MacGinitie Reading Test**

<table>
<thead>
<tr>
<th>%ile</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 - 24</td>
<td>1</td>
<td>3*</td>
<td>3</td>
<td>1</td>
<td>4</td>
</tr>
<tr>
<td>25 - 49</td>
<td>2</td>
<td>3</td>
<td>12</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>50 - 74</td>
<td>4</td>
<td>2</td>
<td>5</td>
<td>7</td>
<td>8</td>
</tr>
<tr>
<td>75 - 100</td>
<td>15</td>
<td>8</td>
<td>7</td>
<td>10</td>
<td>6</td>
</tr>
</tbody>
</table>

| a      | 1       | 7       | 0       | 2       | 5       |
| b      | 62 - 98 | 12 - 90 | 14 - 99 | 24 - 99 | 0 - 99  |
| c      | 1       | 3       | 5       | 3       | 0       |

Note: *indicates the number of students within each %ile range

a # of students for whom no test results were available
b Range of comprehension scores in percentiles
c # of students attending Learning Assistance Centres

The results of the reading test seem to indicate that four of the classes contained a wide range of achievement levels. The heterogeneity of reading achievement in four of the classes contrasts sharply with the homogeneity in Class 1. Teacher 1's class appeared to be largely composed of children who were above the 75th percentile in reading achievement. If teachers group largely on the basis of achievement, as the literature suggests, then we might anticipate that Teacher 1 would teach the class as a whole in reading while the others may prefer to group.

Only three of the teachers gave an Initial Placement test (Ginn, 1976) to determine the level of the reader to be used (Table 2). In two of the classes (1 and 5) the children
ranged from level 6 (reader recommended for grade 1 or grade 2) to level 9 (reader recommended for grade 3 or grade 4). In Class 4 the children scored at either level 7 or level 8.

Table 2

<table>
<thead>
<tr>
<th>Level</th>
<th>1</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td>6</td>
<td>1*</td>
<td>-</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>9</td>
<td>9</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>6</td>
<td>13</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>4</td>
<td>-</td>
<td>12</td>
</tr>
</tbody>
</table>

Note * indicates the number of students at each level

Organization for Instruction

At the beginning of the current study, the end of the first month in school, all of the teachers had progressed beyond an informal stage in the classification of their students. In some rooms and for some subjects, the classification of students for the purpose of instruction was publicly recognized in the formation of groups. Some teachers were more subtle in their differentiation, preferring to assign different curricular materials (see Appendix 5 for a list of curricular material in use in B. C. schools). These two approaches are not mutually exclusive; often the formation of groups is accompanied by differentiation in the type of
material which is used. Even when organization for instruction was not overt, the particular pattern of children selected to engage in certain activities suggested that a covert form of grouping was in use. It may perhaps clarify matters to first of all describe the organization for instruction which emerged in each room, before proceeding to a discussion of the factors which appeared to govern grouping decisions.

Organization in Class 1

Teacher 1 had three reading groups. The groups were labeled with the name of one of the members of the group. The top group, consisting of seven children were reading *How it is Nowadays* (Ginn, level 8). The middle group, consisting of ten children were reading *Golden Trails* which is the second reader of grade two of the Language Patterns series (Holt, Rinehart and Winston). The bottom group, consisting of three children, were reading *The Dog Next Door* (Ginn, level 7). Two weeks before the Christmas vacation another child returned from a reading diagnostic unit and became a fourth group. Teacher 1 taught the class as a whole for spelling and arithmetic.

Organization in Class 2

Teacher 2 had two groups for reading. Seventeen children were using *Better than Gold* (Macmillan Reading Series), recommended for the first part of grade three, as their class reader. This group also used the second grade two reader in the series (Macmillan) for reading and answering
comprehension questions independently. The second group had six members. These children had had remedial help during the previous year and were assigned *Enchanted Gates* (Macmillan) prescribed for the first part of grade two. They were not assigned a second reader for independent work because Teacher 2 felt that initially they needed to work under close teacher supervision. Both of the reading groups had names. The children were not grouped for either spelling or arithmetic; in these subjects the class worked as a whole.

Organization in Class 4

Teacher 4 had two reading groups: thirteen children were reading *How it is Nowadays* (Ginn, level 8) and ten were reading *The Dog Next Door* (Ginn, level 7). However reading groups in action were only observed on two occasions; Teacher 4 often assigned work to the class as a whole. In arithmetic there were two groups. Nineteen children were using *Investigating School Mathematics* (the prescribed text book) while a small group of four children were using *Mathematics for Individual Achievement*. However the class was frequently given the same arithmetic assignment. Spelling was taught to the class as a whole.

Organization in Class 5

Teacher 5 described her program as individualized and claimed that she didn't have groups. On the second observation (the first week in October) all of the children were using the same reader, *Inside Out* (Ginn, level 9).
However by the second week in October the class had been split into four groups. Thirteen children were still reading the level 9 book, five children were reading *How it is Nowadays* (level 8), three children were reading *The Dog Next Door* (level 7), and three were reading *One to Grow On* (level 6). By the last week in October the groups had been formally labeled and work was placed on the chalkboard under the group names. All of the children were working on the same unit in spelling but the amount of work required was reduced for the members of the third and fourth groups. In arithmetic the teacher had two groups. The top group in arithmetic consisted of children in the first and second reading groups; the bottom group consisted of children in the third and fourth reading groups. As with spelling, the same unit was assigned but the amount of work required was reduced for the second group.

**Organization in Class 3**

Teacher 3 had the most complex system of organization. She described her program as individualized, and indeed there were no groups formally identified by name. Children rotated through centers, but work of different levels of difficulty was placed in the centers, and some children were specifically directed to do certain assignments. In spite of the claim to no groups, a progressive differentiation of children into "hidden" groups emerged. At the end of September all the children were reading *How it is Nowadays* (level 8), but they were called up to the reading circle in groups; the names were read from a list of the results of the Gates MacGinit reading
Work assigned to the children was also differentiated in terms of difficulty. For example, one group of children who were sent to the library were required to list the names of authors of books while another group had to list the authors of stories. The rationale for this assignment was that the first group of children were ready to be encouraged to read books while the second group could still only manage stories. The children who regularly went to the Learning Assistance Center (LAC) were not required to do either activity.

Although there were no formally labeled groups, and group membership could be flexible rather than fixed, it certainly appeared that the teacher had ability strata in her head which she used to determine the instructional groups: none of the LAC children was ever included in the top group. By the middle of December the absence of formal group names led to the practice of asking for "all the children who didn't read yesterday", or alternately naming a child and asking for the members of the same group to come forward. Although at the beginning of the year all children began reading in the same book (level 8), by the first week in December four of the children were being given assignments from *The Dog Next Door* (level 7).

Similarly, progressive differentiation in spelling was noted. Initially, all children were assigned the same spelling work cards. In the second week of October four children were selected to start the prescribed spelling
program because they had done well on the Gates reading test. By the middle of November another group was started on the spelling program. The remaining seven children, four of whom were attending the LAC were still working on the spelling cards which had been assigned in September. The teacher did not start them on the spelling program because "it is too much for them to handle". By the end of November some movement of group membership had occurred but it appeared that there were three distinct groups for spelling. Group one now had twelve children, and group two had ten children. Both groups were working on different units and therefore had to be tested separately. The third group consisted of five children who still had not started a spelling program.

In arithmetic, the children were all assigned the same workcards and activities. However, when a new concept was introduced, it was introduced separately to two groups of children, and the level of the work was differentiated. For example, the introduction of place value was done with one group of fourteen children, and counting by hundreds to one thousand was stressed. A second group of nine children were called up by name: three of these children were LAC children. Place value was also introduced, but counting by tens to one hundred was stressed.

Factors Influencing Organization

The seeming diversity in organization in the five classrooms may obscure some underlying general
characteristics. It is perhaps the general characteristics of the organizational structures which have greater significance than the details. In this section several commonalities which crystallized from the observational data will be discussed. This section begins with a discussion of the factors influencing organization. In particular the traditional idea that achievement is related to grouping decisions is examined. It is suggested that although teachers consider student achievement levels, organization also reflects the constraints of time. Secondly, the general stability of group membership is discussed; and the proposition advanced that this reflects a functional response to the demands of the classroom environment. Finally, the difference between organization in reading, where teachers generally grouped, and in arithmetic, where they generally taught the class as a whole, is examined. It is concluded that these general characteristics of classroom organization raise questions about the validity of the traditional view that the task of the teacher is to meet the individual needs of students.

**Achievement Levels and Grouping**

The teachers used three distinct kinds of information in order to group pupils: anecdotal reports, either oral or written, from the child's previous teacher, results of achievement tests and the results of their own observations. Usually, the information from several sources was combined. Only one of the teachers, Teacher 2, appeared to group solely on the basis of information from the previous teacher. In
addition, she commented that the LAC children formed a "natural" group. Teacher 1 grouped according to information from the previous teacher, but changed her groups on the basis of the additional information from the results of the placement test. The other three teachers appear to have used only test information, together with their own judgement.

The literature suggests that achievement influences grouping decisions. However, a comparison of the achievement levels in comprehension on the Gates test with the groups within each classroom suggests that there was no one-to-one correspondence between achievement level and groups (see Table 3). Teachers seemed to have placed children of the same achievement level into different groups, and conversely, children at different levels of achievement into the same group. Rosenbaum (1980) comments on this "overlapping" phenomenon as a characteristic finding of studies where the focus of investigation was the homogeneity of groups composed on the basis of ability.
### Table 3
Group Membership and Achievement Levels
Gates MacGinities Reading Test

<table>
<thead>
<tr>
<th>Group</th>
<th>0 - 24</th>
<th>25 - 49</th>
<th>50 - 74</th>
<th>75 - 100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Class 1</td>
<td></td>
<td></td>
<td></td>
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<tr>
<td>1</td>
<td>-</td>
<td>-</td>
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<td>7</td>
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<td>7</td>
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<tr>
<td>3</td>
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<td>1</td>
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<td>Class 2</td>
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<td>2</td>
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An investigation of the achievement levels of the members of each group, as measured by the Gates test, seems to suggest that achievement had greater saliency for some teachers than for others. It might be argued that as a standardized test the Gates test measures general characteristics of reading achievement; consequently, its pragmatic value may be limited.
Three of the teachers gave the Ginn Placement test (see Table 4). The practical advantage of this test is that it recommends at which level of the reading series the students should be placed. The composition of Teacher 4's groups and Teacher 5's groups (Table 4) suggests that they grouped primarily as a result of the Placement test: their groupings do not reflect as closely the results of the Gates test (Table 3).

Table 4
Group Membership and Achievement Levels
Initial Placement Test

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Note * indicates the number of students at each level
N indicates the number of students in each reading group

Factors other than achievement may influence organizational decisions. The extent to which subjective information influences the decisions made by teachers is probably idiosyncratic, but it seems likely that all teachers are influenced to some degree by the impressions they form as
a result of daily contact with the children. In this group of teachers, classroom information probably was used. In particular Teacher 3 made a point of explaining that she likes "to see what they can do during September". Teacher 4's search for information was slightly more formalized in that she gave her own teacher-made tests during the second week of school. It seems reasonable to conclude that achievement as measured by tests, by anecdotal reports or by observations, figured prominently in the grouping decisions made by these teachers, but perhaps did not determine the placement of children in instructional groups in all the classrooms.

Time Constraints and Organization

Teachers typically talk of grouping as a means to better suit instruction to the abilities and aptitudes of individual students. Accordingly, one would predict that achievement level would significantly influence grouping decisions. Yet the data shows the existence of within group variability in reading. Furthermore, if teachers group according to the individual differences of students, one would anticipate that classes which were heterogeneous in achievement would have more groups while those which were homogeneous would have less groups. Clearly, this is not supported based on the observations in these five classrooms. While teachers did utilize achievement data to organize their classes in reading, they did not for arithmetic. Additionally, children were moved from groups on the basis of their classroom performance, rather than their achievement as
measured by tests. This seems to suggest that grouping decisions may have been influenced by concerns other than maximizing the potential of individuals.

One possible explanation is that teacher talk may be influenced by the traditional conceptualization of teaching as meeting the individual needs of learners. On the other hand, teacher action may be more constrained by the practical necessity of dealing with groups of learners. Although all the teachers talked about the difficulty of not having enough time to get everything done, only one teacher appeared to perceive the influence of time on her organization for instruction. Teacher 2 reported that she grouped primarily on the basis of information from the grade two teacher. She also indicated that she did not differentiate further between her pupils because of the constraints of time. Teacher 2 remarked that one of her reading groups was large and that she could split it. She maintained that the advantage of keeping the group intact was the organization of time: "You have to be really organized and watch your time with three groups". She intended to split the group after Christmas when they would be ready to move into another series of readers (Language Patterns). She thought it would be necessary to split the group at this time because she felt that the series was harder and that a few of the children would be able "to move at a faster pace and do the harder exercises".

This teacher's organization in spelling was also influenced by the constraints of time. She taught the class
as a whole because it "takes less time to teach the class as a whole". She also preferred not to group in arithmetic because "there wasn't enough time to work with the groups properly and not enough time to work with individual children". She reported that she had grouped the previous year because of the variation in achievement levels in that class. She didn't intend to split the class for arithmetic this year as "the children are quite similar in achievement". Although this teacher was the only one who appeared to appreciate, at a conscious level, that grouping affected time use in a classroom, all of the other teachers who grouped seemed to face time allocation problems. (Time allocation difficulties are discussed in chapter six).

It seems reasonable to consider that organization for instruction in reading may have been influenced by time factors. Perhaps the aim of meeting individual needs within a collective setting is idealistic but not practical. Teachers do not have the luxury of permitting individual students unlimited time as part of their mandate is to have the class cover the material for the grade level. Although philosophically teachers may be wedded to the notion of meeting individual needs, the practical necessity of covering a certain amount of work during the year may lead to the development of a compromise. The division of a class into instructional groups may reflect an accommodation to individual differences at a gross level of analysis; although groups were not homogeneous in composition the faster learners
generally appeared to be separated from the slowest. However, once grouped, the children in an instructional group proceeded through the curricular materials at the same rate (cf. Barr, 1975, p. 492). Consequently, it is suggested that classroom organization functions to effect a compromise between the time needs of individuals and the time needs of the class as a whole.

Stability of Groups

Generally, group membership was relatively stable but the general stability in group membership should not imply that changes were never made. Movement between groups did occur but it was not common and took place quite early on in the school year. Even in the rooms which had clearly identified groups with stable membership, there seemed to be a settling in period, the first two to three weeks of school, where teachers were apparently assessing the fit between individual students and the group to which they were assigned. In two of the rooms where changes occurred in initial group placement teachers reported that they moved students on the basis of achievement test results. In Class 4, one child was moved up to the next reading group because the teacher decided he was "incorrectly placed". In the other room, Class 1, two children moved up and two moved down. One child was moved from the bottom to the middle group, and one from the middle to the top: two of the top group children were moved to the middle group.
It is probably incorrect to assume that these teachers made these moves strictly on the basis of achievement test results. In Class 4, the child to be moved up was also observed to be finished ahead of the group to which he was originally assigned. How far finishing quickly influenced the teacher's decision is hard to evaluate, but she did move one child down in mathematics, without the corroboration of test results, because he "couldn't cope" and rarely finished the assigned work.

The four moves in Class 1 are interesting as only one of them reflects the results of achievement testing; a boy who scored at the lowest level (level 7) on the placement test was moved from the top to the middle group. Two of the other children who also scored at level 7 were moved up: one from the bottom to the middle group and one from the middle to the top group. The fourth move, a boy who scored at the highest achievement level in this class (level 9) was moved from the highest group to the middle group. The teacher commented that he was a "bright boy" who was not working well. Later on in the term she commented that she was having to keep him in after school because he was not finishing his work. In contrast to this poor worker, the two children who were moved up were both described by the teacher as being "good" workers. The suggestion arising from these observations is that some teachers may initially form groups on the basis of achievement but then make adjustments according to whether particular children can keep up with the speed of the group.
In general grouping, whether formal or "hidden", was more stable than flexible and rapidity of grouping appeared to be linked to stability. Three of the classrooms were grouped by mid September (1, 2 and 3), and the fourth formally organized room (5) had labeled groups by early October. These groups remained stable at least during the period of this study. Class 3, where "hidden" groups appeared to be operating, demonstrated a certain flexibility in grouping arrangements. There appeared to be three core groups for most of the term but membership did fluctuate somewhat. In December when more stable groups (still unlabeled) appeared to have emerged, most noticeably in spelling, a change was observed. Children were regrouped into five groups. The teacher identified this as a "democratic" grouping procedure because the children selected which of five sets of spelling work they wished to do. Also at this time, the reading books were temporarily abandoned in order to read a story from another book which was associated with some social studies work being done by the class. For this story, the class was divided into two groups and the work differentiated according to the achievement level of the members of the groups. One of the groups had read the complete story independently on the previous day and took turns reading passages orally. The second group read one or two pages silently under the direction of the teacher and then answered comprehension questions orally. Although this was a change in grouping, and therefore represents a more flexible approach, achievement
level still seemed to be the dominant force. The conclusion was reached that apart from initial changes generally group membership was static rather than dynamic. The flexible grouping advocated in the reading methodology literature (Alexander, 1979; Smith and Johnson, 1976), based on interest, friendship, topics etc. did not appear to be utilized by these teachers.

Discussion

It is argued that the groups emerged in response to the demands of the classroom environment. Consequently, the general stability of group membership after the original settling in period was interpreted as reflecting a functional organizational pattern. The claim that grouping emerged as a response to the demands of the classroom environment requires some elaboration. Traditionally, the job of the teacher has been conceptualized as meeting the needs of individual learners. It is perhaps instructive to investigate the practical ramifications of attempting to meet the individual time needs of students. In order to meet individual time needs presumably teachers would have to permit individuals as much time as they required to complete the work. Indubitably some students will take more time and others less time; consequently differences in performance rates may be anticipated. Differences in performance rates likely have managerial consequences; students with time on their hands are a perennial nightmare for teachers. Differences in
performance rates likely also have instructional consequences; children who work quickly will likely cover more of the curriculum than children who work slowly. This analysis raises two questions: to what extent can teachers manage classes in which there are substantial differences in performance rates, and secondly, to what extent can teachers enable students in such classes to cover the material for the grade level.

Attempts to meet the time needs of individuals may have consequences which are undesirable both managerially and instructionally. Consequently, it is proposed that teachers attempt to steer a middle course and organize their classes so that they avoid substantial differences in performance rates and substantial differences in coverage. Grouping appears to have the potential to effect this compromise. Teachers may avoid extremes in performance rates and extremes in coverage by conducting groups of learners, similar in time needs, through the curriculum at the same time.

It has been argued that grouping is a compromise which permits teacher control of coverage, and yet ameliorates, to some extent, the problem of differential performance rates. In effect, grouping may be seen as reducing differences in performance rates amongst students. The idea that grouping may reduce performance rates seems diametrically opposed to the traditional notion that grouping functions to meet individual needs. This apparent paradox may be resolved by utilizing the concepts of manifest and latent functions
The distinction between manifest and latent functions was introduced by Merton (1967) to differentiate between conscious motivation for social behavior and its objective consequences. Manifest functions are those consequences which are both intended and recognized; latent functions are those consequences which are unintended and unrecognized. Accordingly, one might argue that the manifest function of grouping is to better meet individual needs. This certainly seems to be the intention of teachers when they group. Grouping permits a more appropriate matching of curriculum materials to student achievement levels. Presumably this consequence of grouping is intended and recognized by teachers. However, the unintended and unrecognized consequence of grouping is that students with different time needs are treated as a single unit and therefore cover the curriculum at the same time. Accordingly, one might propose that the latent function of grouping is to reduce differences amongst students. The distinction between manifest and latent functions provides a conceptual tool which is useful in separating intentions from the consequences of behavior. Consequently, the analysis of grouping in terms of its latent functions has the potential to resolve the apparent contradiction between the intentions of teachers and the consequences of their actions.

The argument that situations or events have unintended and unrecognized consequences does not imply a one-to-one
Merton (1967) explicitly rejected the idea of the universality of functions. He argued that different social forms may serve the same function and conversely that the same function may be diversely filled by alternative social forms. This idea of functional alternatives stands in opposition to the concept of universality. Accordingly, one might question if any other form of organization, besides grouping, functions to reduce differences amongst students, or if grouping has different functions.

It is appropriate at this juncture to return to the main thread of the argument. It will be recalled that it was argued that the manifest function of grouping, meeting individual differences, does not completely explain the observational data of the five classrooms. Yet it seems reasonable to maintain that the existence and survival of this organizational pattern suggests that it has an adaptive function. If this is so, then it becomes eminently reasonable to attempt to account for the existence of this pattern in terms of its latent functions, or its unrecognized and unintended consequences. The purpose of the following discussion will be to persuade the reader that the interpretation of grouping from the point of view of its latent functions provides greater insights into classroom processes than the traditional interpretation which emphasizes the manifest function of grouping.
To Group or Not To Group

The most noticeable generalization arising from the observational data is that the teachers tended to group in reading but not in arithmetic or spelling. One might conclude that the teachers tended to discriminate amongst pupils for reading but appeared to ignore differences in arithmetic and spelling. Although two of the teachers, Teacher 4 and Teacher 5, did have groups in arithmetic which implies some differentiation, each class generally operated as a whole. Analogously in reading, although Teacher 5 claimed not to have groups which implies lack of discrimination of differences, in actuality she generally selected particular sets of children to read at different times.

The prevalence of differentiation in reading and lack of differentiation in arithmetic and spelling prompts a discussion of some possible explanations for the differences in organization between these subjects. In the ensuing section two possible explanations are examined. First, differences arising from general cultural predilections are discussed. Secondly, the influence of time constraints on organization are considered. Classroom time constraints are seen as increasing the possibility of management and instructional problems. Organization for instruction is interpreted as functioning to reduce such problems. It is suggested that grouping reflects a tradeoff of mastery for coverage, and conversely, no grouping reflects a tradeoff of coverage for mastery.
First, the proposition that student achievement may be reflected differentially in the organization for instruction is considered. On the one hand, it seems feasible to argue that individual differences in reading achievement are more marked than the differences in achievement in arithmetic and spelling. Skill in reading appears to be influenced by experiential factors such that differential exposure to language use might be expected to lead to increased variability in reading achievement (Harris and Smith, 1976; Smith, 1978). Grouping in reading may be an organizational response to these differences. However, traditionally the teaching of arithmetic and spelling have been the province of the schools; it is less likely that many students have had the exposure to these subjects to significantly influence achievement. Hence, one might reasonably anticipate less variability in these subjects than in reading. The tendency to keep the class working together in arithmetic and spelling may reflect greater homogeneity of achievement in these subjects.

On the other hand, actual variability may be comparable across the different subjects and teachers may choose to differentiate only in reading for particular reasons. A concomitant of grouping for instruction is the division of instructional time amongst the groups. Instructing the class as a whole has the advantage that the material may be presented to all the children at the same time. If time is limited, one might anticipate that teachers would be reluctant
to group, as it would be difficult to instruct each group adequately, and also cover the prescribed amount of material: it will be recalled that Teacher 2 explicitly made this argument for her lack of grouping in arithmetic. This appears to be a possible explanation of the differences in organizational patterns in reading and arithmetic. In B.C. schools the time allotment for the primary grades is 640 minutes for Language Arts (45% of the total time) and 200 minutes for arithmetic (14% of the total time). Extra time for Language Arts likely permits teachers to make differentiations amongst students: there is more time in which to deal with two or three reading groups. However, the limited time in arithmetic likely hampers the instruction of groups, and therefore provides an explanation for the lack of differentiation in this subject.

In reading the teachers assigned books of different reading levels to each group. It seems reasonable to argue that giving students of disparate reading levels the same reading material will likely lead to the faster students finishing quickly, while the slower reader will require more time. Differentiation of the level of the material likely results in the faster workers receiving harder assignments, which presumably take longer, and the slower workers receiving easier assignments, which presumably require less time. Accordingly, differentiation of the level of the work likely functions to reduce the performance rates amongst students. In effect, it is proposed that differentiation of the level of
work may function to equalize the performance rates of the students. Perhaps grouping children of similar ability, and ensuring that each group has material commensurate with their reading achievement, may better be interpreted as functioning to ameliorate the problem of differential performance rates, than as an accommodation to individual differences.

In arithmetic and spelling students were generally assigned the same work, sometimes with modifications. Teaching the class as a whole permits the presentation of curriculum material to all students at the same time thus avoiding the instructional problem of differential coverage. Consequently, it is proposed that no grouping in arithmetic functions to equalize content coverage. Therefore, it might be argued that both differentiation and lack of differentiation amongst students, which have consequences in terms of equalizing performance rates or equalizing curriculum coverage, are responses to the time constraints of the classroom, and function to reduce management and instructional problems.

A further analysis of organization for instruction is warranted. Grouping typically provides for differentiation of difficulty level of instructional material. As an example, consider the provision of books of differing levels of difficulty to reading groups. Exposure to books of different levels of difficulty likely leads to differing levels of mastery (or depth of learning). It is suggested that the differentiation of readers represents a compromise between the
incompatible goals of coverage and mastery. To require all students, irrespective of reading ability, to read the grade three book would presumably require much time. The likelihood exists that a pace of instruction which would be suitable for the poorer readers would slow progress to the extent that the class would not finish the prescribed text. In effect, it is suggested that by differentiating the level of the reading material, teachers are trading-off mastery by some students, for coverage of the grade three curriculum by others. Specifically, the children in the lower groups would not likely reach a grade three level of reading achievement, but the children in the higher groups would be able to cover the curriculum.

On the other hand, no grouping (whole class teaching) typically involves a lack of differentiation of instructional materials. As an example, consider that arithmetic and spelling were taught to the whole class, using basically the same instructional material. In order for the class to progress in unison, coverage is likely to be slow; in this case coverage of the curriculum is traded-off for mastery. It is suggested that differentiation or lack of differentiation among students reflects a compromise between curriculum coverage and curriculum mastery rather than an accommodation to, or disregard of, individual differences. Consequently, attention is next directed to the processes underlying differentiation.
Leveling and Sharpening

There is some evidence that even at the end of the first week with a new class teachers are capable of making discriminations amongst students (Good and Brophy, 1978). In spite of progressive dicta to treat students as individuals these initial impressions seem to suggest that teachers tend to classify students. It has been suggested that this tendency to classify is functional in that it enables the teacher to reduce what otherwise would be inordinate complexity (Doyle, 1979; Shavelson and Stern, 1981). The comments of teachers to researchers or colleagues at the end of the first week no doubt are informal, and how these influence or are related to later classifications which are formalized as instructional groups, is a question which might be answered empirically. Nevertheless, an early tendency of teachers to note similarities and differences amongst students has been established.

The classification of students into instructional groups implies that teachers are responding to similarities and differences amongst their pupils. Given that classes are composed of unique individuals, grouping would appear to involve the suppression of some characteristics and the highlighting of others. Presumably teachers attend to features which are salient for their purposes and suppress characteristics which are irrelevant. The tendency to disregard or obliterate differences has been called "leveling" and the tendency to respond excessively to fine nuances or
small differences has been called "sharpening". Klein (1951) argues that "leveling" and "sharpening" are principles which shape perception and are ways of resolving disequilibrium when the task is to cope with differences. If we accept that the task of the teacher is to deal with the individual differences presented by a class of children, the constructs of "leveling" and "sharpening" may prove to be useful. Some teachers may "sharpen" the differences amongst pupils and therefore perhaps move towards a more individual approach to instruction, preferring to spend time with individuals or small groups rather than spend time with the whole class. Others may choose to "level" or disregard the differences, and tend to deal with the class as a whole.

Klein (1951) suggests that "leveling" and "sharpening" are adaptation responses designed to bring about an equilibrium. It is proposed that leveling of differences, in the form of whole class teaching, functions to equalize curriculum coverage. Conversely, sharpening of differences, in the form of grouping, functions to equalize performance rates. It was suggested that teachers group when time is plentiful and teach the class as a whole when time is limited. In this way organization for instruction functions to maintain an equilibrium between the time needs of students and the dictates of the curriculum. In effect, it is argued that grouping and whole class teaching, although governed by the different perceptual strategies of leveling and sharpening, are functional alternatives because the unintended and
unrecognized consequence, the maintenance of an equilibrium between the time needs of individuals and coverage of the curriculum, is the same.

Advantages and Disadvantages. The major advantage of leveling or disregarding differences is that curricular material may be presented to all students at the same time. This avoids the problem of the allocation of time to groups. When time is limited, this would appear to be an efficient way to attempt to cover the material. A major disadvantage of a class functioning in unison is the tendency to move at the speed of the slowest members. To the extent that teachers wait until all the students have completed assignments before they move on to the next topic, they may not cover all the units in the curriculum. Under this regimen the class may be exposed to a limited number of objectives. This may result in reduced opportunity to learn and boredom for some students.

Similarly sharpening, or differentiation amongst students, has advantages and disadvantages. The formation of instructional groups provides the opportunity for students to progress at different speeds. Presumably grouping permits teachers to attempt a better match between the rate of presentation of the material and student time needs, a procedure which has the potential to avoid both boredom for the faster and frustration for the slower. It is precisely this strength of grouping which is also its greatest weakness. The presence of groups within a classroom requires that instructional time be divided amongst the groups. The teacher
may feel herself better able to meet individual needs by grouping, but may not have enough time to spend with each group. Sharpening, or grouping, may "ease" the problem of instruction to some degree, but increase the difficulty of the allocation of instructional time. Coupled with time allocation difficulties, grouping also requires the management of independent seatwork activities concurrently with the instruction of a group. This form of organization likely makes demands on teacher management skills. Accordingly, it is proposed that forms of organization which reflect sharpening and leveling likely provide only partial solutions to the problem of differential time needs of students.

It is instructive at this time to recall Goodlad's dictum (1962) that no system of organization can provide for individual differences. Grouping may better accommodate individual differences, but at the expense of time allocation difficulties and increased classroom management problems. That grouping is at best a compromise will be demonstrated in chapter four. In spite of elaborate organizational arrangements to accommodate individual differences in performance rates all of the teachers experienced the problem of fast and slow workers. Chapter four is concerned with investigating individual differences in time needs as these were manifested in the five classrooms.
CHAPTER 4

Variation in Performance Rates: Fast and Slow Finishers

In the world at large variation in human performance is an accepted phenomenon. Nobel prizes and Olympic gold medals indicate not only an awareness of individual differences but that they are valued. In the world of the school individual differences are not always so highly treasured. The existence of children who differ in their ability to learn presents the teacher with problems of a practical nature:

Probably the severest handicap that confronts education, especially when it is continued to the secondary and higher levels, is the difficulty of providing materials of instruction and methods of teaching that will meet the varied abilities and proclivities of large unselected groups (Bagley, 1934, p. 110).

One way educators have attempted to solve this problem is through their organization for instruction. In the previous chapter it was argued that organization for instruction functions to maintain an equilibrium between the opposing demands of the time requirements of individuals and of the class. In particular, it was proposed that the latent function of grouping was the equalization of performance rates. In this chapter the extent of differential performance rates is investigated.

Traditionally, organization for instruction focused on the level of achievement, or amount of learning, displayed by students. The emphasis on achievement should not obscure the commonly held notion that amount of learning is related to
speed of learning. Thomas and Thomas (1965) in discussing the heterogeneous and homogeneous ability grouping debate stated what they believe to be a dominant value judgement in North America:

It is unfair to hold back the fast learners and at the same time overwhelm the slow learners by conducting heterogeneously grouped class at one average speed (p. 101).

The tendency during the first part of this century to group together children of like achievement levels reflects this prevailing belief that high ability children learn quickly and low ability children learn slowly.

The layman's intuitive notion of the relationship between level of achievement and speed of learning is conceptually clarified in Carroll's (1963) model of school learning. Traditional differential psychology postulates stable abilities or aptitudes which are thought to be related to school achievement. Carroll presented an alternative view. Individual differences are conceptualized as the time needed to learn to a given criterion under conditions of optimal instruction. Under ceteris paribus conditions, this model predicts that students high in ability will learn in less time, and conversely, that students low in ability will require more time.

**Individual Differences in Time Needed to Learn**

The central feature of the Carroll model is that students have differential time needs. Most of the evidence
concerning variability in time needed to learn comes from studies conducted within the mastery learning tradition. Consequently, most of the studies were concerned with the magnitude of individual differences in the amount of time required to achieve a criterion level of performance (Arlin, 1973; Block, 1970; Carroll and Spearitt, 1970). The range in time-to-criterion has been reported as 1 to 3.4 (Block, 1970), 1 to 4 (Carroll and Spearitt, 1970), and 1 to 7 (Arlin, 1973). Anderson (1976) concluded that these studies support Carroll's (1970) estimate that the range in time-to-criterion in school learning research is approximately one to five. Conversely, if time is held constant, variation in amount learned would be anticipated. Studies in computer assisted instruction corroborate extensive individual differences in amount learned when time is held constant. Atkinson (1968) reported a differences of over 4,000 problems between the fastest and the slowest student in a grade one computer assisted reading program.

A mastery approach to learning emphasizes the setting of fixed achievement goals and allows learning time to vary accordingly. In more traditional programs of instruction students are allowed a fixed amount of time to learn a particular unit or task. In the absence of tests to determine whether learning has taken place, it is probably more accurate to characterize traditional programs as the allocation of time to students for particular tasks. In the day-to-day business of running a class teachers allocate a certain amount of time
(a lesson or a period) in which they would like the students to complete an assignment. The likelihood is that some children will finish more quickly than others. Although differences in time-to-criterion may be of theoretical importance it is the differences between fast and slow finishers which is of practical concern to teachers. The magnitude of these differences in performance rate and the possible influence on classroom processes are areas to be investigated.

Chapter four is concerned with the investigation of the phenomenon of differential performance rates in the five grade three classrooms. The initial task undertaken was to determine the extent of the problem of children who finished the assigned work in less time than that allocated by the teacher. Performance rates were studied by means of a standard task and by naturalistic observations. The chapter opens with the presentation of evidence which supports the existence of differential performance rates in the five classrooms. The second question addressed in this chapter is the magnitude of the difference in performance rates between fast and slow finishers. Next, attention is directed to the responses of the teachers to the problem of differential performance rates. Finally, the ramifications of the strategies adopted by the teachers to accommodate fast and slow workers are discussed, and interpreted within the framework of manifest and latent functions.
In order to establish the existence of differences in performance rates within the classes, the following procedure was adopted. At the end of every five minutes the number of students who had finished the assigned task was recorded. Students were considered to be finished the assigned task if they handed in the work, closed their books, or began another activity. Teachers can hardly be expected to orchestrate activities so that all children finish at precisely the same time. Given the collective nature of classrooms it seems reasonable to expect that children will complete work at different times. It was reasoned that many children finishing in concert is unlikely to be as problematic as children finishing at different times. Many children finishing simultaneously can be accommodated by the introduction of the next activity. It is the management of children finishing assignments at different rates which seems a more difficult problem. The amount of time in which finishing occurred probably reflects the extent of the problem to a better degree than the actual number of children who had finished at any one time. Consequently, the percentage of time in which any finishing occurred is reported.
Table 5

Percentage of Time in which Finishing Occurred

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</tbody>
</table>

Note: B indicates the percentage of time in which finishing occurred before recess.
A indicates the percentage of time in which finishing occurred after recess.
- indicates that no observations were made.

Table 5 indicates that finishing occurred in all of the classes. The low amount of time in which finishing occurred in Class 3 is somewhat misleading; there was no set number of assignments and the children were "never finished" in the eyes of the teacher. As soon as students completed one piece of work they began another, without waiting for the remainder of...
the class. Neither a teacher-paced whole class program (Class 4), nor a student-paced individualized approach (Class 5), avoided the problem of some children finishing ahead of the others. Class 2 permits an interesting comparison. Before recess instruction was provided to two reading groups: while one group received instruction the other children did independent seatwork. Although basically a teacher-paced program, student pacing of seatwork was evident, and children finished at different times. After recess instruction was given to the whole class. This teacher utilized several strategies to keep the class working at the same speed (to be discussed in chapter five), and this is reflected in the percentage of time in which all were working.

The data in Table 5 support the contention that finishing is a fundamental feature of classroom life. The expectation that teachers should keep all students fruitfully occupied seems unrealistic given the collective nature of schooling. If the difficulty of keeping all students occupied is acknowledged, it seems reasonable to ask to what extent most students are working. A further analysis, excluding the fastest 25% of each class, was performed. The results are presented in Table 6. The results show that 75% of the children in each class were occupied for most of the time. Although finishing occurred in all of the rooms, a reasonable conclusion is that the teachers were adept at keeping the majority of the children occupied.
Table 6
Percentage of Time in which the Fastest 25% were Finished

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<th>Class</th>
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<td>A</td>
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<td>-</td>
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<td>-</td>
</tr>
</tbody>
</table>

Note: B indicates the percentage of time in which finishing occurred before recess, A indicates the percentage of time in which finishing occurred after recess, - indicates that no observations were made.

The above analyses were conducted to establish that finishing was a phenomenon of these classrooms. It should perhaps be noted that at this stage the quality or usefulness of the activities provided for the children has not been discussed; types of activities will be discussed in chapter eight. However, it seems reasonable to postulate that some
activities may fill up a great deal of time and keep student busy, but be of limited educational value. Alternately, other activities may be extremely valuable but be such that differential finishing times are unavoidable. For example, Teacher 2 thought it important to provide immediate feedback to students when they had written a story. This necessitated finishers engaging in an alternative activity while the teacher discussed each child's story individually. During this period (visit 8, before recess), a large number of children finished and went on to do some coloring. This was the only time a non-academic activity was observed being used in this room to keep students occupied.

**Rate Ratios of Fast and Slow Workers**

It seems improbable that the phenomenon of differential performance rates will be abolished from the classroom: some children will work quickly and others more slowly. If teachers wait until most children have finished before concluding the lesson and moving on to the next task, then some children may spend a considerable period of time in "neutral". To some extent, time in neutral may be influenced by the differences between fast and slow workers. One way to explore the magnitude of the difference between fast and slow workers is to determine the ratio of time spent by fast students to that spent by slow students.

One of the difficulties with previous studies utilizing rate ratios is the lack of clarity regarding the reference
groups. In computer assisted instruction (Suppes, 1966) it appears that the time taken by only two students, the fastest and the slowest, was used to compute the ratio. This method of establishing the ratio, based upon two extreme cases in a computer assisted individualized program, was rejected for this study as being unlikely to reflect the variability that a teacher encounters in a collective setting. It was reasoned that because classroom instruction is collective in nature, teachers were more likely to be influenced by groups of students who were similar in time needs than by individuals who were extreme. Therefore, it was decided to compute the rate ratio based on the difference between the fastest and the slowest groups.

In order to determine the rate ratio it was necessary to find a non-arbitrary way of establishing the two groups. The problem was to determine two groups of students such that there would be the greatest similarity between members within the group and the greatest dissimilarity between the groups. The problem is analogous to that which confronts the test maker: items have to be selected which will discriminate most clearly the highest from the lowest achieving students. Kelley (1939) determined empirically that the twin requirements of within group similarity and between group dissimilarity were best met when the groups consisted of the top and bottom 27% of the population which had written the test. Accordingly, this rationale was adopted in determining the fast and the slow groups within the classroom. However,
the realities of observation in elementary classrooms, where membership is inclined to fluctuate, suggested a slight departure from the test makers procedure. In order to expedite on-the-spot calculations, it was decided to use 25% instead of 27% as the criterion for membership in the fast or slow group.

A satisfactory method of determining the fastest and the slowest groups was determined in order to investigate within class variability in terms of time needs. Time needs were assessed in two ways, experimentally and naturalistically. The experimental attempt to establish variability in time needs involved the administration to the classes of an investigator selected task, while the naturalistic attempt involved the timing of tasks set by the teacher: the former has the advantage of increased reliability while the latter has the advantage of increased validity.

Experimentally Determined Rate Ratios

The teachers who often used whole class instruction (Teachers 1, 2 and 4) agreed to give a standard task to all the children in their classes. The remaining two teachers (Teachers 3 and 5) thought it would not be "valid" for their classes as they usually did not do the same assignment at the same time; these teachers preferred an individualized approach. One of these teachers (Teacher 3) suggested that her own record of the students' progress in assigned work would provide a better basis for judging relative speeds. The records proved to be extremely informative and will be
discussed later.

One limitation of the standard task was that it had to be easy enough to be completed by all class members in a reasonable amount of time. Accordingly, an exercise was selected from the supplementary material of the grade two arithmetic program currently in use (see Appendix 6). As this worksheet on addition and subtraction of two digit numerals with regrouping is intended to be used at the end of grade two, it seemed reasonable to expect that it would not prove inordinately difficult for grade three students. Subsequently, only one of the classes (Class 2) did this worksheet as two of the teachers (Teachers 1 and 4) reported that they had not covered that work yet and expressed doubt about the capability of the students to do the exercise. These classes were given material from the same source (see Appendix 7) which only covered addition and subtraction of basic facts.

Each of the three teachers presented the worksheets to the children in their own class. The sheets were placed face down on each child's desk. The teacher informed the class that they were going to be doing an exercise for the "visitor" (the author) and should not begin until told to do so. They were told to work quickly but to take care not to make any mistakes. When they were finished they were instructed to take their paper to the "visitor". The author started a stopwatch as soon as the teacher said "begin", and recorded the time that each child finished.
The scores of the children in the classes which did the worksheet on basic facts (Classes 1 and 4) showed little variability; the lowest score was 24 and the highest was 28. The scores of the children who did the worksheet involving addition and subtraction with regrouping (Class 2) showed greater variability in the number correct; the lowest score was 7 and the highest was 24. In order to take into account both speed and accuracy, a correct response rate was calculated by dividing the number correct by the time taken. This was converted to a correct response rate per hour. Correct response rate was rank ordered and the average of the top and bottom 25% was compared to give a correct response rate ratio (Table 7).

Table 7
Correct Response Rate Ratio

<table>
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<td>N 6</td>
<td>X 226.37</td>
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<td></td>
<td>S.D. 28.62</td>
<td>46.10</td>
<td>61.58</td>
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<tr>
<td></td>
<td>Slowest</td>
<td>N 6</td>
<td>X 85.22</td>
<td>209.52</td>
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<td></td>
<td></td>
<td>S.D. 28.79</td>
<td>36.15</td>
<td>55.61</td>
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<tr>
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<td>Ratio</td>
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<td>1:2.43</td>
<td>1:2.14</td>
</tr>
</tbody>
</table>

The results indicate that within each class the ratio of the average correct response rate of the fastest group to that of the slowest group varied between 1:2.14 and 1:2.66. Prior to this task, the teachers had been asked to estimate
the difference in time needs between the fastest and the slowest 25% of their classes. Teacher 2 and Teacher 4 estimated that the slowest children required twice as much time while Teacher 1 estimated three times as much time. The results from the investigator administered task support the teachers' intuitive notions about how much extra time was needed by the slowest children.

Naturalistically Determined Differences in Performance Rates

For the naturalistically determined differences in performance rates, in contrast to the experimentally determined rate ratios, neither the teachers nor the children knew that the tasks were being timed. The investigator recorded when the task was begun, when the fastest 25% of the class had finished and when only 25% were still working (ie., the time when 75% of the class had finished).

A necessary condition for the assessment of variability in performance rate was that a task be assigned to all of the students in a class and that they begin work at the same time. Selection of tasks proved to be somewhat arbitrary as the investigator had to wait until the teachers spontaneously assigned an appropriate task. It was difficult to impose any form of standardization on the collection of this data as some teachers assigned a task to the whole class quite often, while others typically assigned tasks to groups. Another difficulty proved to be that even when a task was assigned to the whole class, sometimes it was curtailed before 75% of the class had finished. In spite of these limitations the data appear to
corroborate that variability in time needed to complete assignments is a feature of classroom life.

In Class 1 a arithmetic assignment was finished by the fastest group in 15 minutes but the slowest were still working on it after 24 minutes. In Class 4 a punctuation exercise took the fastest group 1 minute and 20 seconds and the slowest were still working on it after 7 minutes and 5 seconds. In the same class, the ratio in a printing exercise was 6 minutes 25 seconds to 10 minutes and 30 seconds. A comprehension exercise was finished by the fastest children in 27 minutes and 15 seconds and terminated by the teacher a few minutes later because of recess. The assignment was continued after recess and some children were still working on it 20 minutes later. In Class 5, where children proceeded to assignments at their own pace, the fastest 25% had finished in 90 - 100 minutes while the slowest still had work to do after 160 minutes. In Class 2, the children often did the same work but the teacher actively paced them through it. She would pose a question, wait for the class to write the response, and then carry on with the lesson. As children did not work by themselves at a common task, performance rate ratios could not be ascertained. In Class 3 the individualized nature of the program also did not permit the calculation of a performance rate ratio between fast and slow workers.

Variability in performance rates, which seems to be a concomitant of whole class instruction, also appeared within groups. In Class 5, the top group was told to put away their
work if they had finished: one third of the top group remained working. In the same room the bottom group, consisting of 7 children, was simultaneously working on another assignment. Two children finished within 14 minutes and when the lesson was stopped after 39 minutes, one child in the bottom group still had not completed the work.

Teacher 3 who described her program as individualized kept detailed records of the progress of the children. Records were available for the number of workcards completed in spelling and arithmetic. The records revealed that there was a good deal of difference in terms of the amount of work done by the children which presumably reflects the speed at which they worked. In spelling, the range was from 1 to 15 cards completed with 8 as the median and 4 as the mode. The range in arithmetic workcards was from 1 to 10 with 4 representing both the median and the mode.

Comprehension exercises were a regular feature of the activities provided for the children in this room. Although there was no written record of the number of comprehension exercises finished, the teacher had requirements about how many were to be finished in a certain amount of time. The assignments in the comprehension book were divided into sections containing exercises which emphasized selected comprehension skills, such as finding the main idea and reading for details. The teacher said that she waited for all the class to complete each section before she introduced the following section. On the sixth visit one child was observed
to be working on the nineteenth comprehension exercise while others were still working on the thirteenth. On the tenth visit the teacher made a point of directing children to finish off the nineteenth exercise. One child was instructed to take home the work so that she would be finished before the Christmas vacation. The variability in speed of working was such that some children required approximately four weeks longer than the first finished to complete the required number of comprehension exercises.

The data gathered experimentally and naturalistically seem to support the contention that differences in performance rates were substantial. All classrooms had some students who finished relatively quickly and others who were much slower. Consequently, getting work finished seemed to be an area of concern for most of the teacher. It was common for the teachers to make "finishing" announcements to the whole class. Sometimes teachers changed their instructional plans because of time pressures: for example, during a spelling lesson the teacher decided to move on in order to complete some other work and said to the class: "We'll leave the sentences now otherwise we won't finish". Teachers also encouraged students to get finished: "If you're not finished your arithmetic, you should be working hard". The announcements were also replete with instructions about what to do with work that was unfinished at the end of the lesson: "If you haven't finished your Pilgrim poem, do it in your spare time". Sometimes the impossibility of finishing was acknowledged: "I know you won't
finish but get as much done as you can". It was anticipated that the existence of variability in time needed to finish assignments, both within classes and groups, would be problematic for teachers. Although the teachers readily identified children who worked quickly and children who worked slowly both in discussion and in the classroom - "I know that some of you are fast workers because you've had so much practice at alphabetizing" - they generally insisted that this was not a problem for them. Superficially, the discrepancy between the reports of the teachers and the classroom observations may appear contradictory. Finishing work at different times has the potential to be a practical problem for teachers, if they do not devise means to deal with it. All the teachers in the group had contingencies for dealing with fast finishers and for getting incomplete work finished. To the extent that fast and slow finishers did not cause disruptions in the classrooms, the teachers' insistence upon "no problem" becomes reasonable.

**Strategies for Coping with Fast Finishers**

In the world of work adults are rewarded either for the amount of work completed (piecework), or for the time spent at work. Although classrooms are not workshops, the activities of children in the schoolroom may be regarded from a similar point of view (cf. Brown and Saks, 1980); either a set amount of work is required, or the children must work for a certain period of time. A disadvantage of specifying a set amount of
work is that some children will finish ahead of others. One advantage of insisting that children continue working during the whole time school is in session is that it avoids the problem of fast finishers.

Finishing can only occur when a set amount of work is specified. One way of coping with the problem of fast finishers is to structure the program so that the problem does not arise. This might be labeled the "never finished" approach. In the individualized classroom (Class 3), the children were expected to keep themselves occupied with the work in the centers for the duration of the class time: "Just because your corrections are done it doesn't mean you're finished - take another card". The idea that work was never finished certainly seemed endemic to this room. It was never really clear just how much work or how many cards were to be completed each day. "If you've done one thing get two done, if you've done two get three done". The lack of specification of the requirements gave an openendedness to the program which functioned to accommodate children who worked quickly: in a sense there was always something for these children to do.

From a reinforcement perspective, one might question whether this approach would sustain rapid working behavior. There were no positive contingencies for completing work quickly as there was merely more of the same to be done. Neither was there any negative reinforcement. If work is considered to be an aversive stimulus for children, then completing it quickly did not release them from unpleasant
circumstances. Under the "never finished" regimen there was no legitimate respite from work. However, the children did take illicit breaks and in this they were aided by the physical arrangement of the room. The presence of barriers provided ideal conditions for whispered conferences. Additionally, the self-paced nature of the program provided ample scope for children who wanted to take time out from work. It was not unusual for individual transitions between centers to be quite lengthy affairs. The legitimate movement in the room, to collect supplies and deposit completed assignments in tote trays, also served to camouflage students who spent a long time getting from one center to another.

The lack of specification of the amount of work required on a daily basis may also be seen as related to management problems. The teacher began each morning session by directing children to the various types of work depending upon what they needed to finish. As the session proceeded and the children finished assignments there were those who required to be redirected. There appeared to be no set routine for this; the children rarely approached the teacher to report that a particular piece of work was finished. Usually, the teacher would notice that the wandering behavior had increased and she would ask a particular child what they were doing. The typical response "I've got nothing to do" was generally followed by a standard liturgy - "Have you finished--------?". Those who responded positively were frequently told to take another card.
The problem seemed to stem from the fact that there was no clearly defined rule about what constituted the state of being finished, or what the students should do when they were finished. Because there were no rules (except perhaps the tacit one of keep busy with something), and no procedures for ensuring that students move on to other work, after recess became a time when the teacher was involved in finding work for the children to do. This was generally a hit-and-miss affair, probably because it depended on the willingness or capability of the students to engage in subterfuge, and the teacher's monitoring capacity. On one occasion three girls spent approximately 10 minutes playing with an advent calendar: they were unnoticed because they were obscured from the teacher's view by a divider.

In the remaining four classrooms, it was much clearer what constituted the required amount of work and therefore much easier to identify those who finished ahead of the allocated time. Teachers provided for these children by assigning extra activities. The extra activities were either related to previous work, and therefore constituted finishing off work from previous lessons, or were completely new and unrelated to previous work.

Two of the teachers assigned work to be completed from previous lessons. In Class 2, a list of "things to do" was placed on the side chalkboard each morning. The list was numbered and prioritized in that academic work was required to be completed before unfinished art projects. Each morning,
the teacher read through the list with the class to ensure that all the children knew what to do in the event that they finished the assigned work. In contrast to this structured approach, the other teacher (Teacher 1) told the class what to do when they had finished. Usually this was in response to a child who had finished and wanted to know what to do next. Typically finishing an art project was assigned.

The remaining two teachers typically assigned activities unrelated to the class program. At the beginning of the morning, Teacher 5 generally explained an art project which could be done by those who finished. This teacher commented that she liked activities such as murals for her extra activity because "those who have finished can do more than one drawing". Teacher 4 had a system whereby different activities, such as clay work, painting and games could be engaged in by the children. In order to ensure the smooth running of this system, the teacher had a chart naming the activities and placed name cards under each heading: the children's name cards were rotated on a weekly basis so that all had the opportunity to engage in the different activities.

None of these attempts to deal with the problem of fast finishers seemed to be ideal. In some cases, the explanation of what to do when finished consumed a fair amount of time, yet only a handful of children would attempt the extra activity. In addition, extra projects take time to prepare. Another difficulty with providing extra activities is that it presents an additional possibility for differential finishing
times. The spectre of an infinite regression in finishing appeared to be apprehended by at least one of the teachers who remarked: "I haven't given them any activity for when they've finished (today) because you can have too much finishing".

Strategies for Dealing with Unfinished Work

In addition to coping with children who finished quickly the teachers were also faced with the problem of what to do about unfinished work. Teachers dealt with unfinished work on a daily and a weekly basis. When unfinished work was completed on a weekly basis this was referred to as "catching up". The problem of finishing off and catching up are likely endemic to collective instruction: the group nature of schooling makes it unlikely that all will finish in concert. Therefore time must be provided so that all students have completed the assigned work. Finishing off is to be distinguished from catching up, in so far as the former refers to an individual piece of work, while the latter usually refers to several pieces of work. Catching up also contains the idea that an individual student, or the whole class, has fallen behind a schedule. Individual children are told to catch up when they are behind their group or class. Teachers talk about classes catching up when they have fallen behind their schedule. Catching up appears to be a more complex term in that it involves reference to a time standard external to the individual or the class.

The most radical solution to the problem of incomplete
work appeared to be to collect it in "finished or not". This solution only appeared in one classroom (Class 4), and only for a type of activity which had a coloring component at the end; presumably most of the children finished the "real" work. Generally, the completion of unfinished work required that extra time be provided. Teachers accomplished this in one of two ways; either extra time in school was used or the children were required to finish the work out of class time.

The provision of extra time within school was accomplished by extending the lesson or by adding the incomplete work to a list of "things to do". Extending the lesson to permit completion of work occurred regularly in only one of the classrooms (Class 4). This strategy seemed to be used whenever the children were engrossed in the task at hand. The suggestion that high on-task behavior of students may be reinforcing, and encourages some teachers to permit extra time, is hard to resist. During conversation in the staffroom, one teacher reported to another teacher with whom she often conferred that she had extended the amount of time devoted to the morning activities because the children had been working so well. In contrast to the one teacher who was regularly flexible with time was another who rigorously adhered to the timetable. In Class 2 all lessons were ended according to the dictates of the clock and incomplete work was added to the list of "things to do".

In Classes 3 and 5, where children worked at their own speed, finishing off took place on a daily basis. In Class 5,
the last 20 minutes of the morning was designated as finishing off time. Those children who had completed the morning work had the opportunity to listen to a story while the others continued working. The first half hour of the afternoon also functioned as a finishing off period. Although officially silent reading time, the majority of children did corrections or finished the work of the morning. In Class 3, the finishing off extended during the first hour of the afternoon. It is reasonable to consider that the extra time required to complete previously unfinished work prevented other kinds of activities from being undertaken.

Even with the provisions of finishing off periods some children still had work to complete. To avoid the use of additional school time teachers often insisted that the work be completed in the students' own time. In most classrooms, there seemed to be a common understanding that work which was unfinished at the end of the extra time would be completed at home. Generally one or two students were specifically instructed to take work home to finish. A remark by one of the teachers indicated that this too was not ideal as it could generate further problems. It appears that some children who work reluctantly at school will sometimes become quite zealous when the work is taken home. Teacher 1 had abandoned the practice of sending work home with one of her slow workers because he invariably completed more than was required. She found that this was a problem because the next day he had already completed the work to be assigned to the class.
Sometimes students were required to complete an assignment before they had their lunch, and on several occasions some children were observed returning early from lunch in order to complete their morning work.

The commonest way of dealing with the problem of unfinished work was what was labeled by one of the teachers as the "three o'clock club". This pleasant euphemism describes the procedure of requiring children to remain after school, if not until work was completed, at least until enough had been done to satisfy the teacher. This requirement did not seem unduly onerous to the children. One child, permitted to go to the gym in spite of unfinished work, commented to her friend, "Better to stay in after school than miss gym". Teachers had no difficulty in naming students who were kept in. Membership of the "exclusive club" was quite limited. Usually only one or two students qualified for membership. These children were the chronic "slowpokes" who consistently failed to finish their work.

Catching Up

Although the teachers generally denied that fast and slow finishers were a problem for them, presumably because they had developed some coping strategies which allowed order to be maintained, all of them talked readily, and in some cases spontaneously, about the problem of catching up. Basically catching up occurred as a weekly phenomenon, although in Class 3 catching up was noted over a longer period of time: children were given several weeks to finish a certain amount
Three of the teachers (2, 4 and 5) preferred to have a weekly catch up period. For two of them (2 and 5) this was a Friday. Teacher 2 assigned less of the regular work to enable the children to complete all of the activities on the list of "things to do". This teacher wanted to avoid carrying work over into the next week: "I like them to start the week afresh". In this classroom there was a definite rhythm to the week. Each day the teacher added more assignments to the "things to do" list, until Friday, when it was expected that everything would be finished. In Class 5, it was customary for the teacher to show a film which was watched by those who were fully caught up. The remaining members of the class tried to finish all incomplete assignments. It will be recalled that this class also had finishing off time each day. Teacher 4 had a catch up period once a week, but the day was not appointed. If she found work mounting up, she would give the class time to catch up in the afternoon.

Catch up sessions are notable for the number of assignments that are being completed simultaneously. Generally when catching up was announced, it would be the main event and other events, such as the movie, were extraneous: such extra activities are likely planned to keep the finishers occupied. Many children finishing different assignments concurrently likely presents a complex supervisory problem. During these catch up periods, teachers tended to keep themselves free from instruction so that they were available
to help individual children and to supervise the class. During these sessions, teacher attention seemed to be directed to determining who had finished all the outstanding assignments. Sometimes the assignments to be finished were listed on the chalkboard. Another common procedure was that the names of children who had incomplete assignments would be listed on the chalkboard; the names were erased as the students finished the work. Teachers who adopted this strategy usually announced to the class that they had spent the previous evening marking the students' notebooks. Presumably the existence of the names on the chalkboard served to signify to the class that the teacher was in earnest.

Discussion

In this chapter differential performance rates in the five classrooms were investigated. Under controlled conditions the performance rate differential between fast and slow workers in three classrooms was of the order 1:2. This is likely a conservative estimate of the differences in performance rates because of the controlled nature of the exercise. Substantial differences amongst students working on teacher assigned tasks, under conditions natural to the classroom, were also documented. Performance rate differences existed in spite of teacher attempts to provide work of varying degrees of difficulty. Consequently, all teachers had developed procedures for keeping faster workers occupied and for having slower students complete assignments.
Strategies for coping with differential finishing rates, like organizational strategies, may be discussed in terms of their manifest and latent functions. Teacher concern with having students finish work and having classes catch up may be interpreted as representing a desire to enhance student learning - the manifest function of schooling. Finishing off and catching up may also have latent functions. It is proposed that finishing off and catching up may be interpreted as attempts to ensure that most students complete more or less the same amount of work. If fast finishers are allowed to move on to the next assignment before the slower students have finished, the expectation is increased variance in terms of curriculum coverage. Homogenization of amount of work completed likely curtails differential curriculum coverage. Consequently, it is argued that the latent function of the strategies of finishing off and catching up is to equalize curriculum coverage.

In chapter three it was argued that teaching the class as a whole functioned to equalize curriculum coverage. In this chapter, it is suggested that the strategies of finishing off and catching up also function to equalize curriculum coverage. A corollary of the equalization of curriculum coverage is that classes are likely to master a limited number of objectives rather than to cover the curriculum. Accordingly, time devoted to finishing assignments, like time devoted to teaching the class as a whole, may be interpreted as a tradeoff of coverage for mastery. Time given up to
finishing assignments, a mastery emphasis, results in the class operating as one organism; new work is not introduced until all assignments are completed. It is proposed that keeping the class together represents a practical compromise to the problem of curriculum coverage and individual differences in time needs. Furthermore, it is argued that by adopting this compromise teachers avoid increased instructional and managerial problems.

The existence of differential time needs may be seen as posing two kinds of problems for teachers, one managerial and one instructional. The image of children with nothing to do is a frequent nightmare for student teachers and for beginning teachers. There seems to be an unwritten rule that children must be kept busy at all times otherwise the schoolroom will sink into chaos. The Puritan notion that the "devil finds work for idle hands" springs to mind (cf. Arlin, 1979). Consequently, teachers generally have some provisions for children who complete the assigned work ahead of time.

There seems to be a general expectation that teachers will keep classes occupied: Doyle (1979) refers to this expectation as the "norm of rationality". Yet, it seems reasonable to ask to what extent teachers can manage classes composed of learners who differ substantially in the speed at which they work. Given a performance rate differential of the order of two to one, the faster students will be finished in half the time it requires for the slower students to complete assignments. If the teacher introduces the next assignment as
soon as the fastest children have finished, then she likely exposes the slower children to a great deal of frustration. Conversely, to wait until the whole class is finished may involve boredom for all but the slowest. Typically, frustration and boredom are demonstrated in high rates of student inattentiveness; presumably an undesirable condition for most teachers. Consequently, it seems reasonable to suggest that time allotments for assignments may be directed at establishing a via media between boredom for the fastest and frustration for the slowest. In other words, time allowance for assignments will be made to ensure the largest amount of student cooperation. This view is supported by the data in Table 5 which suggests that all but the fastest 25% of the class were kept occupied with assigned work for most of the time. The provision of extra activities for these children likely served to reduce the management problems which usually result when too many children finish the assigned work and then have nothing to do.

The managerial concerns of inexperienced teachers may perhaps be over-dramatised; classrooms rarely degenerate into chaos merely because some children finish assignments quickly. However, the effect of differential finishing times on instruction would appear to be a thornier problem. If the teacher attempts to let the students progress through curricular materials at their own speed, she might soon find herself managing several instructional programs in the same room. This involves not only extra planning and preparation
time but also would seem to require extra time within the class for implementation. It is difficult to see how teachers could operate under these conditions, especially with classes of young children who lack the necessary self-discipline to work more or less unaided. Having all children complete unfinished work and providing time for catching up, keeps the class covering the curriculum at a similar speed. It is suggested that teachers avoid the management problems inherent in a diversity of instructional programs by keeping the class together.

Keeping the class together also avoids the problem of differential coverage of the curriculum. If teachers could surmount the management problems inherent in letting students progress at their own speed, the rate differential of two to one indicates that when the work for the year is completed by the faster students the slower students would have completed only half. This situation likely present the teacher of the next grade with management and instructional problems. The strategies of finishing off and catching up appear to ensure that all students cover more or less the same amount of work. A possible disadvantage of this is that all the work for the grade level may not be covered. However, it is maintained that the mastery by most students of fewer curricular objectives is probably more functional in terms of classroom management than the coverage of more objectives by fewer students.

Finishing off and catching up may be considered as
functional alternatives. It is proposed that they are major mechanisms by which teachers keep the class functioning as one organism. Of course not everyone works at the same speed, or covers the same amount of material, but the different strategies for ensuring that work is finished and that the class is caught up seem to be directed at keeping all members of the class moving through the curriculum at approximately the same speed. It is argued that keeping the class together avoids the management and instructional problems inherent in differential performance rates. However, the practical consequences for students may not be so desirable. Time devoted to finishing off and catching up is time which is not available for covering new material. These strategies may lead to decreased opportunity to learn for some students. One might argue that the time devoted to finishing off and catching may serve to depress the performance of the brightest, by keeping them from further instruction, and to enhance the performance of the slowest, by giving them extra time. The long term consequences of time allocated to finishing off and catching up may be to increase homogeneity of student achievement. Given that time is a limited resource in school, it may be that the teacher is confronted with the decision of having to rob Peter in order to pay Paul. (Chapter six describes further the ways in which time is allocated to students in order to compensate for differences in performance rates).

In this chapter, the existence of fast and slow
finishers in each room was examined. Not only were different rates of finishing observed but strategies used by the teachers to mitigate the effects of differential finishing times were described. It was suggested that teachers provide extra time to students to permit work to be finished and that this avoids instructional and managerial problems. It was further suggested that the provision of extra time may function to reduce the differences between students. The learning of slow finishers is likely enhanced because they receive extra time while the learning of faster students is likely depressed because they do not receive further instruction but are in effect waiting for the slower students to catch up. The next chapter, chapter five, is concerned with opportunity to learn as this is represented by the pace of instruction.
A fundamental conflict in teaching is the necessity of meeting the particularistic needs of the individual and the universal needs of the class. Perhaps one area where this dilemma is thrown most sharply into relief is in the matter of instructional pace. It is the group nature of classroom conditions that present the teacher with a dilemma. Teachers attempt to cover material specified for the grade level with a group of students in a limited amount of time. Yet the existence of fast and slow workers within a classroom indicates that the speed at which new material is introduced, the pace of instruction, will not be optimal for all children. Pace is problematic because not all students are capable of proceeding at a homogeneous rate, and neither can the teacher allow unlimited time if she is to cover the material prescribed for the grade level. The present chapter is concerned with the procedures and strategies adopted by the grade three teachers in this study to deal with the problem of instructional pace.

A fundamental assumption underlying the literature on pace is that pace of instruction, or the rapidity with which material is introduced, represents opportunity to learn for the students (Arlin and Westbury, 1976; Barr, 1975; Good, Grouws and Beckerman, 1978). Teachers who pace rapidly cover more of the curriculum, thereby exposing students to more new
material which presents greater opportunity to learn. Conversely, a slow pace of instruction results in less curriculum coverage, less exposure to new material, and consequently, less opportunity to learn. Accordingly, a faster or a slower pace of instruction has consequences in terms of curriculum coverage and learning opportunities for students.

The dilemma facing the teacher may be presented as a dichotomy: coverage of more curricular material or mastery of less. Coverage of the curriculum takes time and mastery, or depth of learning, also requires time. The collective nature of the educational enterprise means that both cannot be accomplished in the limited time permitted for schooling. Consequently, the teacher has to weigh, perhaps intuitively or at a less than conscious level, the value of achieving one objective compared to another. In this chapter, pace of instruction is treated as a problem in value tradeoffs and the question of how teachers balance coverage and mastery in the limited time available for schooling is addressed.

The organization of this chapter falls into four major sections. The first section contains a review of the literature on the relationship of pace to achievement and a discussion of factors which may influence pace. The second section reports the pace of instruction in reading, arithmetic and spelling in the five classrooms. It is concluded that, although variability in pace exists between classes, within classes pace is relatively homogeneous for all students.
Homogeneous pacing is interpreted as reflecting a mastery rather than a coverage orientation. It is argued that the sacrifice of coverage in favor of mastery of fewer objectives functions to reduce instructional and management problems.

The idea generated from the data reported in section two, that teacher behavior may be interpreted in terms of a mastery rather than a coverage orientation, is assessed in section three. In this section the results of a decision making analysis of teacher value preferences for coverage and mastery are reported. The results of the value preference exercises indicate that mastery is a more important goal than coverage. It is suggested that this preference manifests itself in an attempt to keep the class operating at a similar speed. Finally, qualitative observations on potential strategies for keeping the class together are presented.

**Pace of Instruction and Achievement**

Although of intrinsic interest, the question of instructional pace has achieved prominence in the research literature because of its relationship to achievement. Good, Grouws and Beckerman (1978) studied eighteen teachers of grade four mathematics who consistently produced high or low achievement in their students. A record of the content covered during two and one half months (October to December) was collected and the average number of pages covered per day was calculated. Teachers who produced high achievement covered more pages per day (1.1) than teachers who produced low achievement (0.7).
Barr (1974) investigated the effect of pacing on the reading achievement of grade one students. The dependent variables were percentage of words learned relative to words introduced, general word recognition as measured by the Wide Range Vocabulary Test and a reading comprehension score (Gates McGinitie, 1965). Analysis revealed that in classes that were differentially paced at relatively high rates, mean level of word learning and variance were higher than for classes differentially paced at slower rates, or for those paced homogeneously. Generally a faster, rather than a slower, pace facilitated learning in high, and average, ability pupils. All low ability pupils were paced slowly and achievement was low.

Speed of coverage may not necessarily always be under the control of a teacher. A study by Arlin and Westbury (1976) examined the effect of teacher-paced and self-paced instruction on achievement in Science at the grade ten and eleven levels. The dependent variable was learning rate, defined as the number of new concepts of discrete information answered correctly per hour. The learning rate variance of the teacher-paced group was less than that of the self-paced (programed instruction) group. Group learning rate was also lower under teacher management. The authors concluded that teacher pacing had a deleterious effect on the achievement scores of the more able students; lower ability students demonstrated no difference in achievement under either pacing conditions.
In their discussion Arlin and Westbury (1976) suggested that teacher pacing had a leveling effect on achievement by limiting the opportunity to learn of the abler students. They maintained that the teachers appeared to set a pace that was better adapted to the needs of lower ability students. Similarly, Dahllof (1971) and Lundgren (1972) claimed that teachers adjust the pace of their instruction to the needs of a steering criterion group.

The Steering Group Hypothesis

Dahllof (1971) hypothesised that teachers adapt instruction to the progress made by their pupils. Furthermore, he argued that there is a tendency to begin teaching a new unit of work when the majority of the class have the necessary prerequisites. Thus, he proposed that teachers adjust their instruction to the needs of pupils between the tenth and the twenty-fifth percentile of the performance distribution. In effect, these students act as a steering criterion group for curricular decisions. The time needed to enable these students to reach satisfactory levels of achievement will reduce the time available for learning. Coverage of the material may be sacrificed for the mastery of a limited number of objectives. The more capable students may be denied exposure to curriculum content. Consequently, the achievement level of the class may be artificially depressed.

Some confirmation of Dahllof's hypothesis that pace of instruction is geared to the students between the tenth and
the twenty-fifth percentiles was provided by Lundgren (1972). Lundgren investigated the role played by the students in this group in pedagogic communication. He found that they were the recipients of more teacher questions and also that they responded more often than other students.

An issue related to the steering criterion group is the leveling effect of teacher pace. Bloom (1968) argued that the school system is elitist in nature and functions to perpetuate the artificial differences between students. Under traditional organization, time for learning is held constant: achievement varies as a function of individual differences. According to Bloom, the outcome is the exacerbation of original differences and increased heterogeneity of achievement variance. However, if teacher pacing decisions are governed by a steering group of lower ability students, a contrary position emerges. Class-paced forms of schooling may be seen as creating artificial similarities amongst learners (Arlin, 1979). In other words, homogeneous achievement may be a function of using lower ability children as a steering group in order to pace instruction. This may result in the fast learners being held back by the slowness of pace necessary to accommodate the needs of students of lower ability. If the steering group hypothesis is tenable, then the range of performance rates within the class may be important in determining the deleterious consequences for higher ability students.

Apart from the investigations by Dahllof (1971) and
Lundgren (1972), little attention has been addressed to the possible constraining effects of classroom conditions on pace of instruction. If a teacher paces quickly, curriculum coverage will be increased, but it is unlikely that all students in a class which is heterogeneous in ability will be able to keep up. Faster pacing may produce higher mean achievement but at the expense of increased achievement variance. The group nature of schooling places a limit on the increase in variance which is tolerable; increased heterogeneity is associated with increased management problems (Evertson, Sanford and Emmer, 1981). Conversely, if teachers pace slowly, coverage of the curriculum will be curtailed and achievement thereby reduced. Slower pacing may decrease mean achievement but reduce achievement variance. This analysis suggests that coverage may be reduced in order to avoid the increased problems associated with faster pacing. It also suggests that teachers who pace quickly likely have found ways of decreasing the negative consequences of a fast pace.

Measurement of Pace

Pace of instruction has been measured in several ways. Good, Grouws and Beckerman (1978) measured the number of pages covered per day in arithmetic. Barr (1974) measured the number of words introduced to a student in a specified time period. These studies concentrated on how much new material was introduced. In contrast Arlin and Westbury (1976) included an estimate of how much was learned. Their dependent variable was "learning rate", the number of new concepts of
discrete units of information answered correctly per hour. The former measures of pace are purely measures of quantity covered; the latter is more sophisticated in that it includes an assessment of quality of coverage because total amount learned is included in the measure.

None of these measures of pace attempts to index directly the difficulty level of the material. The assumption is that all the material presented in the studies is of a comparable level of difficulty. The assumption of comparability across units of information is probably reasonable when all students cover the same material; even if some pages are easier than others the students eventually do the same work. This assumption becomes questionable when students are using material which is obviously discrepant in terms of difficulty. This problem surfaces in most elementary classrooms where the practice of assigning reading books of differential difficulty levels is common. How are we to equate number of pages covered in an easier reader with number of pages covered in a more difficult book? In this study, the following rationale was adopted. It was assumed that teachers matched reading books to the reading ability of the students. Therefore, in spite of the objective easiness or difficulty of a reader, each book presented a similar degree of subjective difficulty for each student. In other words, the poor reader with the easier book and the good reader with the difficult book likely have to expend comparable amounts of energy to cover the same number of pages. An analogy may be drawn to
horseracing. Horses which have won in a previous race carry additional weights as a handicap. The good reader may be thought of as carrying the handicap of a harder book. The interesting question is that even with the handicap will he cover the same number of pages, or more, than the non handicapped student.

One other limitation of the data on pace needs to be discussed. In one classroom it was extremely difficult to measure coverage in reading because the stories were not covered in sequence. Teacher 5 left out some stories "because they were silly" and did others "because the children liked them". The remaining four teachers covered the stories in sequence therefore it was possible to estimate their pace with a reasonable degree of accuracy. However, number of pages covered remains purely a measure of quantity and does not include an estimate of how well the stories were covered. Children may have merely read the pages or have done additional work on the stories. The estimate of pace used in this study does not take into account the thoroughness of coverage or how much was learned.

Procedure

During each visit a record was made of the work the children were doing and the page number of the textbook in use was recorded. In reading the total number of pages covered was divided by the number of days between the first and last observation to yield an estimate of the average number of pages covered per day.
The estimate of pace in arithmetic was somewhat more difficult as teachers did not always use the textbook, but assigned teacher-made exercises or commercially produced seatwork. A record was made of the content of the lesson and this was matched with the textbook. In this way it was possible to determine on which unit the class was working. Pace was estimated by totalling the number of pages in the textbook of each unit completed, and dividing this by the number of days between the first and last observation. Only one pace of instruction was recorded for each class in arithmetic, because even in the two classes (4 and 5) which had groups in arithmetic, the children frequently did the same assignments, or slightly modified versions of the same assignments.

Pace in spelling was somewhat easier to estimate. Four of the teachers used the same spelling book and introduced one unit per week, while the fifth teacher introduced ten new words per week. Consequently, the number of words introduced was divided by the number of days between the first and the last observation.

Results

Pace in Reading. Four of the teachers reported that they covered one to two stories per week, and that they did the same number of stories with all of their groups. Teacher 2 estimated that she covered two to three stories per week. Three of the teachers (1, 4 and 5) reported that the children
would progress through the same sequence of readers, but they anticipated the slow group would cover less material and do it more slowly. None of the teachers expected their slow groups to finish the curriculum.

Pace of instruction in reading is reported in Table 8. The average number of pages covered per day is reported for only four classrooms, because of the difficulty (discussed previously) of estimating pace in Class 5. The fastest pace was maintained by Teacher 2. In this class both groups covered more pages per day than any other groups in any of the other rooms. At the beginning of the year the lowest group in this room covered more than twice as many pages as the top groups in other rooms. Yet the six children in this group had been identified as having reading problems, and until grade three had received remedial teaching from a learning assistance teacher. Most were reading at grade 1.6 level as measured by the Gates McGinitie reading test given at the end of grade two.
Table 8

Pace in Reading
Average Number of Pages Covered per Day

<table>
<thead>
<tr>
<th>Group</th>
<th>Class</th>
<th>1</th>
<th>2</th>
<th>3</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>1.65 (3)</td>
<td>4.04 (2)</td>
<td>1.66 (2)</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>4.33 (3)</td>
<td>5.36 (2)</td>
<td>1.75 (3)</td>
</tr>
<tr>
<td>3</td>
<td></td>
<td>1.44 (3)</td>
<td>1.44 (3)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>1.69 (3)</td>
<td>1.47 (3)</td>
<td></td>
</tr>
</tbody>
</table>

Note: Grade level of the reader is enclosed in parentheses.

Similarly, in Class 1 the second group not only covered more pages per day than the top group in the same room, but also more than the top groups in classes 3 and 4. Initially this appeared somewhat anomalous. Further investigation revealed that these teachers (1 and 2) managed to have lower ability children cover more pages by using books at an easier reading level.

Both teachers started the lower group children reading easier books at the beginning of the year. In Class 2, the second group began reading the first reader of grade two in September, and had finished by early November. During the early part of the year, the slow group covered 251 pages while the top group covered 139 pages. (The top group were reading the regular grade three reader). The teacher indicated that her intention was to have the slower group cover the work at a
faster pace than the top group because these children had a lot of catching up to do. During the earlier part of the year while they were reading the easier reader, the low group covered an average of 5.36 pages per day compared to the average of the top group of 4.33 pages per day. However, when they finally transferred to the regular grade three reader, the average dropped to 1.75 pages per day. It is notable that even in the grade three reader these lower achieving children were still covering more pages than higher achieving children in the other rooms.

Teacher 1 adopted a similar strategy. She started her second group out on a reader which is usually read at the end of grade two. In this easier book the children were covering 4.04 pages per day. When they were finally transferred to the grade three reader the average pace dropped to 1.48 pages per day. When the second group finally began the new reader, it was the beginning of November, and the top group had already covered 76 pages of this reader. As might be expected, the second group trailed behind the first group and when the final observation was made in late December 80 pages still separated the two groups.

In Class 3, the pace of instruction was the same for all students. In this room, the children used the same reader, but the teacher instructed the two groups separately. As both groups read the same stories, at the same time, pace of instruction was homogeneous rather than differentiated. Class 3 had the slowest pace of instruction (1.44 pages per
Pace in Arithmetic. Pace in arithmetic is recorded in Table 9. Teacher 2 the faster pacer in reading, was also the fastest pacer in arithmetic. The pace of 1.65 pages per day is even faster than that maintained by the high achieving teachers (1.1) in the Good, Grouws and Beckerman study. In contrast the slowest pace of .75 pages per day is comparable to the pace of the lower achieving teachers in the same study (.7). The problem of difficulty level is not taken into account in these estimates but it is interesting to note that the fastest pace (1.65) was obtained on the most difficult units (advanced unit on place value and a unit on multiplication). The slowest pace (.75) was also obtained on the most advanced place value unit.

Table 9

Pace in Arithmetic
Average Number of Pages Covered per Day

<table>
<thead>
<tr>
<th>Class</th>
<th># of pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>.85</td>
</tr>
<tr>
<td>2</td>
<td>1.65</td>
</tr>
<tr>
<td>3</td>
<td>.91</td>
</tr>
<tr>
<td>4</td>
<td>1.09</td>
</tr>
<tr>
<td>5</td>
<td>.75</td>
</tr>
</tbody>
</table>

Pace in Spelling. Pace in spelling is displayed in Table 10. Four of the teachers used the same series in spelling. Three of them (Teachers 2, 4 and 5) generally introduced one unit per week. Teachers 2 and 4, the fastest
pacers in spelling, covered all the 36 units by June but Teacher 5 had only finished up to unit 31 by the beginning of June. Teacher 5 frequently interspersed the units in the book with her own lists of spelling words: for example, at Hallowe' em, Thanksgiving and Christmas words associated with these occasions were introduced. Teacher 3 also used the same program, but introduced it to different groups of children at different times. Although the second group appeared initially to be covering the words faster than the top group, they never caught up. At the end of the year neither groups had finished the program; group one had covered 27 units and group two, 23 units. Teacher 1 followed her own program and introduced ten new words a week. During the follow up visit in June in the spelling lesson it became apparent that the students had completed the program. The children were instructed to "Use your errors to make up a list as we've covered all our words". Each child selected an error from their own work and contributed it to the class list for the week.
Table 10

Pace in Spelling
Average Number of Words Covered per Day

<table>
<thead>
<tr>
<th>Class</th>
<th># of pages</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
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</tr>
<tr>
<td>2</td>
<td>2.57</td>
</tr>
<tr>
<td>3 Group 1</td>
<td>1.47</td>
</tr>
<tr>
<td></td>
<td>2 2.45</td>
</tr>
<tr>
<td>4</td>
<td>2.57</td>
</tr>
<tr>
<td>5</td>
<td>1.98</td>
</tr>
</tbody>
</table>

Discussion

These data suggest that variability in pace of instruction in reading, arithmetic and spelling existed between the five classes. When the three subjects are considered simultaneously, Teacher 2 emerges as the fastest pacer. All of the teachers adopted some form of grouping for reading which would appear to facilitate differential pacing. In the three rooms (1, 2 and 4) where groups were clearly established the degree of differentiated pacing is questionable. In Class 4 the top group, reading a level eight book, covered 1.69 pages per day while the lower group, reading a level seven book, read 1.47 pages per day. It is unlikely that this represents real differences in amount covered. The expectation is that these groups would maintain their order relative to each other at the end of the year. A follow up visit in June revealed that each group finished one
reader and would be proceeding to levels eight and nine respectively in the following year.

Classes 1 and 2 allow for some means of comparison in rate of coverage because the children in groups one and two within each room eventually read the same book. Once difficulty level was constant there was little difference between the pace of either group in Class 1 (1.65 to 1.48 pages per day). However in Class 2 the difference is considerable; the top group covered 4.33 pages per day while the second group covered 1.75 pages per day. It might be anticipated that the students in the two groups in Class 1 would finish the year having read a comparable amount but that there would be a great difference between the amounts read by the two groups in Class 2. The positive relationship between pace and achievement allows the prediction that achievement variance in Class 1 would remain constant over the year but that achievement variance would increase in Class 2 unless the teacher found ways of slowing up the top group. It is interesting to speculate whether this teacher's plan for her top group would achieve this goal; she indicated that she intended to transfer this group onto a "harder" series of grade three readers after Christmas. A follow up visit in June revealed that she had carried out her plan. This group of children therefore covered three readers with the teacher, but they were all at the grade three level.

In spite of grouping for instruction it is concluded that most of the children were paced at relatively the same
speed. Similarity in pace was accomplished by using different readers for each group and keeping constant the number of stories read. The only exceptions to this pattern were the two classrooms where the instructional pace for the slower groups was faster than the instructional pace for the top groups during the earlier part of the year in order for the slower groups to catch up. Once the slower children did begin reading the grade three reader, only one teacher paced the groups differentially.

Teacher Control of Pace. Pace generally designates the speed at which the material to be learned is presented to the students. Pace of instruction has been considered as an independent variable (Barr, 1974) or as a dependent variable (Arlin and Westbury, 1976; Good, Grouws and Beckerman, 1978). In spite of the fact that pace was treated as an a dependent variable in two of these studies, it is clear from the discussions that the authors consider pace to be potentially under the control of the teacher.

Arlin (1979) and Barr (1974) both commented that questions on pacing seemed to confuse teachers. Similarly, in the present study most of the teachers found questions on pace to be quite puzzling when the material to be covered was not divided into temporal units. Questions on pace in reading and spelling were answered with reference to the number of stories or units covered per week. In these subjects all teachers had the idea that they covered a certain amount per unit of time. In arithmetic the response was different. The arithmetic
program is organized into topics, and time allocations are suggested in the guide book, but the format of the textbook does not indicate approximately how much should be done each week. Teachers seemed not to know how they made decisions about moving on in arithmetic. One of the teachers indicated that she moved onto a new topic in order "to give the students a change". Two teachers (2 and 3) indicated that they gave end-of-unit tests. As they were already prepared to start the next unit, it is unlikely that the result of the tests influenced their decision to move on. Teacher 2 commented that she liked to test the students so that she had objective evidence to give to the parents regarding their children's performance in arithmetic.

Although researchers consider pace to be potentially under the control of teachers, this idea surfaced in the conversation of only one of the teachers. Teacher 2, the fastest pacer, planned how much she wanted to cover in a prescribed amount of time. Often she commented on how far she had progressed with this class in reference to last year's class. Spontaneously, she used the word "pace". She commented that she did not fall behind in her work and that "the pace seems OK". She maintained that she "set the pace" and that almost all of the children managed to keep up; she named only one of the slow group children as not reaching her expectations. This teacher appeared to be conscious of her active control of the pace of instruction. If she missed a reading or an arithmetic lesson, she rescheduled it during
socials or science. In contrast the remaining four teachers appeared reactive rather than active. They talked about "getting behind" but did not generally reschedule lessons so that they could get "caught up".

Although most of the teachers seemed to be unaware of their potential impact on pace, nevertheless pace of instruction was controlled largely by them. Self-pacing by students which occurs under programmed instruction was not observed. However, in the two classrooms where the teachers described their programs as individualized, partial self-pacing occurred. In Class 5, the teacher introduced the work at the beginning of the day, but the children worked largely at their own speed for most of the morning. Control of pace was maintained by the teacher by the strategy of scheduling catch up time for the last twenty minutes of the morning. This enabled her to introduce new work at the beginning of each day. In Class 3, the teacher also introduced work, but it was scheduled to last for several weeks. Consequently, children worked at their own speed for much longer periods of time. However, the teacher still expected all students to have completed the same amount of work by Christmas. In this room, the speed at which new material was introduced into the various centers was controlled by the teacher, even though the rate of work was controlled by the students. Although the students could control their own speed of work somewhat, in both rooms the teachers still had ultimate control of the pace of instruction, because in the absence of programmed materials
the students could not move ahead until the teacher provided the work.

Coverage or mastery. In spite of the appearance of individualized programs, and even though these children generally worked at their own speed in these two rooms, and also occasionally in the other three rooms, it was concluded that fundamentally pace was under the control of the teachers rather than the students. Teacher pacing decisions are likely governed by several factors. Barr (1975) commented that basic orientations to coverage or mastery may influence teacher pacing practices. Covering the curriculum was evidently of some concern to all of the teachers; in particular all of the teachers talked about the difficulty of covering the grade three arithmetic program. They were in agreement that there was not enough time to cover all of the topics and that some of the topics were too difficult for grade three students. Typically, teachers reported that they concentrated on the basic number operations of addition, subtraction, multiplication and division. Most left out the work on fractions, geometry, volume, area, money, measurement and time. One reported that if there was time she would introduce some of the topics in the spring. One argument for leaving out fractions was "that gets done in grade four". One compromise adopted by two teachers was to incorporate the measuring unit into science. One of them commented that by doing this she "did not have to take up valuable arithmetic time".
The difficulty of covering the work in Language Arts was not felt as keenly, perhaps because of the greater time allocation, and also because the curriculum is described in more general terms. In contrast to arithmetic, in Language Arts the teachers did not appear to feel pressured to cover certain topics. Additionally the possibility of integrating Language Arts work into other areas of the curriculum seemed clearer. One teacher explained, "You're really doing Language Arts in socials and science". However, several did mention that they did not have enough time for plays, poetry and creative writing, activities which they felt were particularly time consuming. Plays, in particular were mentioned by one teacher as a source of management problems. She commented that one of the difficulties with plays was "that while you spent time with the cast, you had to leave the rest of the class to get on by themselves".

Although teachers expressed a great deal of concern regarding the difficulty of getting through the all the work, this was more noticeable in arithmetic than in Language Arts. However, the solution in both cases involved a reduction in the amount to be covered. In reading, the teachers found a viable solution to the problem by differentiating the content to be covered; the provision of readers of different levels of difficulty in effect reduced the amount of time required by the slower children to complete their work. The problem of coverage in arithmetic was more marked, presumably because all of the teachers, in effect, taught the class at the same
speed. All of the teachers, to some degree or another, did not even attempt to cover all of the topics in the arithmetic program. In most cases coverage was restricted to the four basic number operations. Leaving out a substantial portion of the arithmetic curriculum likely represents decreased opportunity to learn at least for some students. These data suggested that the teachers attenuated coverage in favor of having all students complete a restricted number of topics or assignments; mastery appeared to be a more important goal than coverage. Consequently, a value preference exercise was designed in an attempt to collect additional data which might corroborate the observational and interview data.

A Decision Making Analysis of Pace

A common approach to the study of human decision making is policy capturing (Shulman and Elstein, 1975). Typically, subjects are presented with a series of stimulus situations and asked to make a judgement or decision about each of the situations. The stimulus situations are scored on one or more variables which are used as independent variables in regression analysis to predict the subject's decisions. If the prediction is accurate the resulting regression equation is said to "capture" or represent the "policy" that the subject used in arriving at the decision.

A word of caution is in order. Policy capturing techniques produce a paramorphic representation of the judgement process which duplicates the decision outcomes rather than an isomorphic representation of the mental
operations engaged in by the subject (Hoffman, 1960). Consequently, the policy captured by regression analysis may be in conflict with the subject's own description of the process. Subjects often claim to use a complex model to reach their decisions yet simple models typically duplicate judgement outcomes extremely well (Dawes and Corrigan, 1974; Einhorn and Hogarth, 1975; Shulman and Elstein, 1975). Therefore, the results of the value preference simulation indicate how the responses of the five teachers are related to the characteristics of the situations judged by them, but do not necessarily represent the way the teachers thought about the characteristics before they made their decisions.

Procedure

Each teacher completed two exercises. The first exercise was designed to elicit teacher preference regarding mastery and the second exercise, teacher preference regarding coverage. Instructions and rating forms are contained in Appendix 8. In exercise one, teachers were asked to rate their level of satisfaction if a particular reading group learned to a particular degree in a specified amount of time. Reading groups were designated as low, average, and high; degree of learning was designated as unsatisfactory, satisfactory, and good; and teaching time was 30, 60, or 90 minutes per day. Reading groups, stories covered, and teaching time were combined factorially to give 27 combinations which teachers were required to rate in terms of their happiness or satisfaction. For example, the first
combination rated by the teachers asked them to consider their degree of satisfaction if the high reading group learned satisfactorily in 90 minutes. In exercise two, the three reading groups and the three teaching times were combined with number of stories covered, to realize 27 combinations which teachers were asked to rate in terms of personal satisfaction. For example, the first combination in this exercise required the teachers to consider their degree of satisfaction if the low group covered 50 stories in 30 minutes. In both exercises, the order in which the combinations were presented was the same for each teacher and was determined using a table of random numbers. Satisfaction was rated on a scale of 1 to 10, with 1 representing the least, and 10, the greatest amount.

Analysis

Typically, the data from all subjects are aggregated in a regression analysis. The tacit assumption is that each teacher has exactly the same policy (Shavelson and Stern, 1981). In this study a stepwise solution (Kerlinger and Pedhazur, 1973) was used to analyze the choices of each teacher separately in order to estimate the policy of each individual. In exercise one, teacher satisfaction was predicted from degree of learning (mastery), teaching time, and reading group level; in exercise two, satisfaction was predicted from degree of coverage, teaching time, and reading group level. In both exercises, satisfaction was treated as the dependent variable. In exercise one, coded vectors for
mastery, time, and group were treated as independent variables: in exercise two, coded vectors for coverage, time, and group were treated as independent variables. The order of entry and the relative contribution of each variable were examined.
Results

Table 11 displays the percentage of variance accounted for by mastery, time, and group (Exercise one). In all cases, mastery entered the equation first and accounted for most of the variance (59% to 90%); time and group accounted for very little of the variance.

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Mastery</th>
<th>Time</th>
<th>Group</th>
<th>Total R²</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>70</td>
<td>17</td>
<td>-</td>
<td>87</td>
</tr>
<tr>
<td>2</td>
<td>76</td>
<td>5</td>
<td>5</td>
<td>86</td>
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<tr>
<td>3</td>
<td>59</td>
<td>8</td>
<td>-</td>
<td>67</td>
</tr>
<tr>
<td>4</td>
<td>80</td>
<td>11</td>
<td>2</td>
<td>94</td>
</tr>
<tr>
<td>5</td>
<td>90</td>
<td>-</td>
<td>-</td>
<td>90</td>
</tr>
</tbody>
</table>

Table 12 contains the percentage of variance accounted for by coverage, time, and group (Exercise two). Only in the case of Teacher 3 and Teacher 5, who described their programs as individualized, did group account for any significant percentage of the variance. For three of the teachers (1, 2 and 4), time figured prominently in their consideration of their satisfaction with coverage, while time appeared not to be significant for Teacher 3. The order of entry of the variables differed across teachers. For three of the teachers (3, 4, and 5), coverage entered first followed by time. This provides a contrast with Teacher 1 and Teacher 2 for whom time
entered first.

Table 12
Percentage of Variance Accounted for by Coverage, Time, and Group
Exercise Two

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Coverage</th>
<th>Time</th>
<th>Group</th>
<th>Total $R^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>36 (2)</td>
<td>43 (1)</td>
<td>-</td>
<td>79</td>
</tr>
<tr>
<td>2</td>
<td>31 (2)</td>
<td>34 (1)</td>
<td>-</td>
<td>65</td>
</tr>
<tr>
<td>3</td>
<td>72 (1)</td>
<td>-</td>
<td>13 (2)</td>
<td>85</td>
</tr>
<tr>
<td>4</td>
<td>41 (1)</td>
<td>29 (2)</td>
<td>-</td>
<td>70</td>
</tr>
<tr>
<td>5</td>
<td>48 (1)</td>
<td>5 (3)</td>
<td>28 (2)</td>
<td>81</td>
</tr>
</tbody>
</table>

*Note* Order of entry of the variables is in parentheses

Discussion

The data from exercise one indicate that a simple model predicted a large proportion of the variance in teacher satisfaction; one variable, mastery, accounted for most of the explained variance. In contrast, two or three of the variables were required to model teacher satisfaction in exercise two. These data suggest that ratings of satisfaction with mastery were relatively unconstrained by considerations of time or group membership. In contrast, when asked to rate satisfaction with coverage, only two of these teachers (3 and 5) did not appear to consider the time element to any great degree; but both of these teachers did appear to consider group. This suggests that most of the teachers weighed either time or group when considering their satisfaction with coverage. These results are interpreted as corroborating
classroom behavior; teachers generally allowed time for finishing work (achievement of mastery) which necessarily reduced the time permitted for coverage. If teachers satisfaction with mastery, but not with coverage, is unconstrained by time considerations, it seems reasonable to infer that mastery is more important to them.

It seems germane at this point to speculate on the importance of mastery to teachers. One might argue, idealistically, that a desire for thoroughness of learning is a fundamental value preference of pedagogues and springs from a philosophic conviction that "a thing worth doing is worth doing well". This charitable interpretation of a desire for mastery relates to the manifest function of the role of the teacher, to increase student learning. An analysis of mastery in terms of its latent function points more to pragmatism than to idealism.

A mastery preference has pragmatic ramifications for classroom management. The granting of extra time to students for the completion of assignments necessarily involves curtailment of the curriculum, and is more related to the needs of students of lower ability. In terms of management, it is precisely these children who need to be kept occupied in order for the classroom to operate smoothly. These are the children who become frustrated with work which is too difficult, and fractious when left unoccupied, and therefore are likely to demand the teacher's attention. Consequently, a mastery orientation, geared to the time needs of these
children, has the potential to alleviate management difficulties.

A mastery orientation may also be seen as playing a pragmatic role instructionally. The difficulty of instructing heterogeneous classes has been discussed previously (see chapter four); the management of several instructional programs in one room is demanding and time consuming. A mastery value preference may function to maintain homogeneity of curriculum coverage by keeping the class working at the same speed, thereby reducing instructional problems.

**Keeping the Class Together: Qualitative Observations**

In the five classrooms, teacher pacing functioned to keep the class moving through the curriculum at roughly the same speed. Even when classes were grouped for instruction, as for example in reading, the average number of pages covered by the groups was similar. In the one exception where pace was clearly differentiated, it was argued that lack of exposure to material at the next grade level functioned to prevent the faster students from getting too far ahead.

Teachers appeared to be engaged in the task of keeping the class working at the same speed rather than permitting individuals to progress at their own speed. The strategy of keeping the class together likely serves some function. Evidence from a study or junior high classes (Evertson et al., 1981) indicated that increased heterogeneity is associated with increased difficulties in classroom management; the authors suggested that responding to a wide range of
individual differences places inordinate demands on teachers. Keeping classes moving through the curriculum at roughly the same speed may serve to avoid, or at least reduce, the management problems associated with increased heterogeneity.

It is suggested that keeping the class together is a functional response to the difficulty of managing classes of children who differ in time needs. Given the existence of fast and slow workers, keeping the class together requires the manipulation of the speed at which the children work. Two strategies with general, or whole class effects, and four with specific effects on a segment of the class, were identified. The general effect strategies functioned to speed up the slower, and slow down the faster students, simultaneously. Specific effect strategies are those techniques which teachers used to actively manipulate the speed of certain segments of the class. Two general devices, one organizational and one instructional, are discussed first.

General effect strategies

It is posited that two strategies had a general effect on the class, by simultaneously slowing down the faster and speeding up the slower students. The strategies are the demarcation of the beginnings and ends of lessons and the modification of the content studied.

Beginnings and Ends of Lessons. Arlin (1979) conjectured that transitions (the ending of one activity and the beginning of another) may serve as an indirect cue to students regarding their pace of work. He argued that
transitions provide feedback as to whether students need to speed up, or whether they may adopt a more leisurely rate of work. If this is so, transitions which are clearly demarcated should function as better student pacing cues. Transitions in which all students are involved simultaneously likely provide clearer cues than transitions which are not simultaneous.

In three of the classrooms (1, 2 and 4) all lessons were begun and concluded by all students in concert. Typically, the teachers stood at the front of the room and requested the children to take out the appropriate materials from their desks. At the conclusion of the lesson, on a signal from the teacher, all books were handed in or replaced in desks, and the material for the next lesson was prepared.

In these three rooms, students regularly received unambiguous feedback on their rate of work. In the fastest paced class (Class 2), the signals were even more explicit. In this room the transitions were noticeably fast. After taking out their books, without a signal from the teacher, the children dated their work, to indicate the beginning of a new assignment. At the end of the lesson, if they were not at the bottom of the page, they were required to rule off, "with a ruler to show that you are finished". It seems inconceivable that a child could fail to understand if he worked more slowly than the rest of the class.

In this fast paced classroom, even within lesson segments were clearly marked in this distinctive way. When calling up a group for reading the teacher identified the
group by name, and specified what the children were required to bring with them to the reading circle. The end of each session was also clearly marked; "I'd like to go on discussing the story but there isn't time now. Return books and quietly return to your seats".

Another aspect of the behavior of Teacher 2 provided an unambiguous cue about when the lesson was to be concluded. Ten to fifteen minutes before recess, toward the end of the reading lesson, the teacher would begin to monitor the students' work. Systematically, she went up and down the rows, marking books, admonishing those who were behind, and praising those who had finished. The regularity of this behavior served as a very clear signal that the end of the lesson was approaching rapidly. It is expected that this signalled the start of a spurt, or rapid working behavior (DeVoss, 1979), on the part of students who were unfinished.

In contrast to this structured approach, the remaining two rooms (Classes 3 and 5) had extremely flexible transitions. Children worked largely at their own rate and deposited completed work in tote trays to be marked. As the beginnings and ends of work sessions were not marked in any formal way, it was likely difficult for children to draw any conclusions about their rate of work. Typically, the work period continued, without formal interruptions, until recess. The bell was the signal for the children to cease working; work was not put away, but was left out, and the children resumed their activities when they returned from recess.
In Class 3, there was little pressure from the teacher to get work finished; therefore children could spend as long as they wanted on each activity. Student transitions in this room were quite lengthy; five minutes between centers was not uncommon as it was difficult for the teacher to monitor individual transitions.

In contrast to the urgency in the fast paced classroom, group reading lessons in Class 3 room were characterized by a sense of drift. It was never very clear which children were required for the lesson as group membership was not clearly specified in this room. Accordingly, several minutes were taken up ensuring that the correct people were in the group. It was also unclear when the circle session had finished. Usually some children were sent off to work on specific assignments, but invariably a few children would remain; eventually all members of the group wandered away. Often the teacher would leave the group she was teaching to attend to another matter, become deflected by other children, and fail to return. Eventually, the children in the group were absorbed into the various activities in the room.

**Modification of Content.** It is proposed that structured transitions operated as an organizational device to keep the class functioning at the same speed. Modification of content seemed to serve the same purpose, but in the instructional sphere. One way of keeping the class together is to cover the same content, but in a different manner. This technique was clearly observed in Class 3 where pace in
reading was undifferentiated.

In Class 3 there were "hidden" groups, but children initially used the same reader, and the pace of instruction was homogeneous. Although the groups generally used the same reader, they read at different times and in a different manner. The top group did "round robin" reading while the "other" group, smaller in number and composed of children who were lower in ability, did directed reading. "Round robin" reading involved each child reading a paragraph out loud while the remainder of the group listened and followed along in their reader. In directed reading the teacher assigned two pages to be read silently and then asked questions to check comprehension. The "groups" in this classroom appeared to be constructed more to facilitate management than to aid instruction. By taking the children in two groups and modifying instruction, the teacher was able to cover the same work, and yet reduce boredom and frustration to a greater extent than she would have done had she tried to deal with the class as a whole.

The differential handling of the reading groups permitted the maintenance of a homogeneous pace. Homogeneous pacing may be accomplished by simultaneously preventing the faster group from moving too far ahead and by speeding up the slower group. Teacher 3 prevented the top group from moving ahead by having them read the story twice; prior to the oral reading they had read the story silently. In contrast, the slower group only read the story once. To attempt round robin
reading with the second group would have been a difficult, and
time consuming experience, as most of the students were poorer
readers. Typically, oral reading by poorer readers is marked
by lengthy hesitations and many errors which eventually
produces boredom and restlessness in the listeners. Silent
reading avoids this management problem. The children's
understanding of the story was assessed by comprehension
questions. Responses to the questions, and the teacher's
subsequent elaborations of the responses, likely served to
"fill in the gaps" for the students who failed to understand
the story as they read silently.

Another example, drawn from the same room illustrates
the difficulty of maintaining a homogeneous pace in a
classroom where the students differ in ability. In an
arithmetic lesson, the teacher introduced all the students to
the concept of place value, but she divided the class into two
groups, and proceeded to give separate demonstrations.
Although the basic concept was introduced to the two groups,
both the substance and the materials used were different.
Group one (the more advanced children) used plastic tags, and
counted out groups of ten into little plastic bags. They were
required to make up ten bags to represent one hundred. Then,
the group pooled their bags, and counted the number of
hundreds they had. The second group (the less advanced
children) used chestnuts, and counting by tens to one hundred
was stressed.

Modification of content was also used by the teacher of
Class 5 in both spelling and arithmetic. Although she had groups, in both subjects the children were assigned the same work, but the slower groups were expected to do less work. For example, in spelling the top group did all the exercises and copied out the list words twice a week; the lower groups were instructed to miss out certain exercises, and they only copied out the list words once a week. Similarly, in arithmetic the top group did more difficult examples (subtraction of hundreds, tens and ones with regrouping), while the lower groups were only expected to do subtraction without regrouping. Modification of content slowed down the faster students and speeded up the slower students so that the class could continue to be paced homogeneously.

**Specific Effect Strategies**

In contrast to general strategies which have the potential to affect all members of the class, specific strategies are directed at segments of the class. Four specific effect strategies, slowdown messages, "mad" marking, instructional fragmentation, and speeding up are discussed next. The two former strategies are seen as directed at slowing down faster students, while the two latter are seen as ways of helping slower students keep up with the rest of the class.

**Slowdown Messages.** Working quickly demonstrates an efficiency which is highly prized in a society dominated by the Protestant work ethic. Therefore, it was anticipated that slowdown messages, if they occurred at all, would be indirect.
The indirect slowdown messages received by faster working students who completed work ahead of transitions have already been discussed. The student who finds himself "with nothing to do" when he has finished an assignment likely also interprets this as a slowdown message. However, more direct slowdown messages did occur. A direct slowdown message occurred when a teacher made explicit the relationship between a slower speed and an improved piece of work. In Class 4, slowdown messages were frequently addressed to the whole class. For one assignment the children were asked to print eight lines of poetry, a total of 46 words, and were told that they had 25 minutes to finish. The teacher was explicit about the children taking care and not rushing their work: "If you need more time you can have it after recess". This project eventually was concluded after 40 minutes. To slow down the class, the teacher introduced "special" paper. It was foolscap paper but from her comments to the class, and from the verbal expressions of delight, and the smiles on the faces of the students, it was apparent that this was seen as a treat which called for careful work. The teacher also announced that she had "special" stickers for perfect work. After giving out the paper, the teacher spent three minutes giving a running commentary on what she expected - name, date, starting at the margin, very best work, don't rush, you've got plenty of time, how to space and so on. This behavior resembles what Kounin (1970) has called task overdwelling. There could be little doubt in the minds of the children that they were
expected to take a long time, and to produce a superior product.

A similar type of behavior was observed on another occasion. Again the teacher was explicit about doing "your very, very best". One student, who was typically the first to be finished, showed her work to the teacher as being nearly finished. The teacher responded, "Don't do a rush job". She then selected the work of another child, held it up so that all could see and commented, "You're all doing a good job, but this one is especially nice".

"Mad" Marking. Another slowing down procedure is the phenomenon of "mad" marking. In both classrooms described as individualized (Classes 3 and 5), the teachers spent a great deal of time marking the work of the students, and then requiring them to do corrections. In Class 5, where marking and correcting at times reached frenetic proportions, an analysis was made of who was required to do the correcting. As students finished their work, they placed it in a tote tray at the feet of the teacher. She worked steadily through the pile and called up the students to do corrections. It was invariably the students who completed their work quickly who were required to do corrections. Rarely did students in the lower group finish and place work in the tray to be marked. Consequently, in this room, the children in the "top" groups did more work, and therefore more corrections, than children in the lower groups.

It may be argued that doing corrections is a worthwhile
activity. While some correcting may be a legitimate way of increasing student learning, it is questionable whether some forms of "automatic" correcting serve this purpose. Some assignments, particularly workbook assignments, are constructed with two options. Corrections are "automatic" if the chosen option is marked as incorrect; automatically, the student knows that the other answer is correct, and that all that is required is to erase the first answer and circle or underline the second answer. It seems that requiring fast finishers to do corrections, particularly when the corrections are automatic, may function to prevent them getting too far ahead of the slower workers.

**Instructional Fragmentation.** Fragmentation occurs when a meaningful unit of behavior is broken into smaller components and attention is focused on the subunits when the behavior could have been performed as a single, uninterrupted sequence. Kounin (1970) introduced the notion of prop or actone fragmentation, in which the teacher breaks a behavioral sequence into smaller steps, and has the children perform each step. An example is requiring everyone to remove pencils from their desks, and then instructing them to remove their books. Instructional fragmentation occurs when a teacher separates learning material into small parts, and requires the same, or different, children to answer each part. For example, in the current study during an arithmetic lesson when the children were responding to material in the textbook, the teacher went around the group:
'Read the next number, J. How many thousands, A.? How many hundreds, K.? How many tens, S.? How many ones, P.?'

This pattern was repeated for each question. Needless to say, the group rapidly became very restless. The fragmentation of instruction contributed to the slow within lesson pace, just as in Kounin's research (1970) actone fragmentation was associated with slowdowns behaviorally.

Similar fragmentation was observed in another room, also during arithmetic. Instead of naming the numbers represented by the Dienes blocks which the teacher had displayed on the chalkboard ledge, the children had to count out the sequence in a chorus - 100, 200, 300, 400, 410, .... 480, 481, 482, 483 - as the teacher pointed to the blocks. These children seemed very impatient with this approach; some counted too quickly, some just jumped ahead to the answer. Those who just said the answer were required to practise the correct mode of response so the class went through the sequence again.

It is interesting to question the functional nature of instructional fragmentation, especially as this technique was accompanied by restlessness and off task behavior. It is conjectured that the teachers adopted this form of instruction to keep the class together. Specifically, this approach is one way that the teacher may accommodate the slower learners in the group. In all cases where this technique was observed the teacher appeared to be attempting to ensure that all students understood the material. In Class 1, where this
approach was used for every arithmetic lesson, the teacher also typically went through the exercises orally with the class, before she assigned them to be done as seatwork. If children responded incorrectly, she followed up on the incorrect responses, even though signs of inattention and restlessness were evident. A typical comment was "Let's do that again; some people were confused". Perhaps teachers may tolerate decreased attention from some members of the class in order to ensure that other students understand the assignment.

**Speeding Up.** The domination of the work ethic in this society suggests that speeding up the slower students may be a more legitimate activity than slowing down the faster students. There were many direct attempts to speed up slower students: all teachers made "hurry up" comments at one time or another. In the fastest paced classroom, the teacher frequently told the students how much time they had to finish their work and often gave reasons for hurrying up "so we can get on to another job".

One very clear example of speeding up a particular segment of the class was observed in Class 4 during arithmetic. The teacher grouped together five of the slower learning children and often spent all of the arithmetic lesson "talking" this group through the assignment. It is conjectured this behavior was necessary because she gave this group the same assignment as the rest of the class; it is doubtful if they could have finished without extensive help.

This "helping" behavior, addressed particularly to
lower achieving children, was also observed in other rooms. In Class 3 the teacher, somewhat exasperated, admitted that she was finally tired of spending her time with the lower achievers. She had selected five children to go for learning assistance, not to receive remedial instruction, but to receive help with "work habits". These children had difficulty getting their work done and were described as "not getting their act together". Perhaps training in "work habits" was one attempt to get these children to work faster.

In this section the ways in which teachers keep a class operating at a homogeneous pace were discussed. A class may be paced homogeneously at either a fast or a slow rate. In this sample of five teachers one paced more rapidly than the rest. Rapid coverage of the curriculum likely involves efficient use of time. Therefore teachers who pace classes at a fast rate likely have developed techniques to reduce interruptions and the wasting of time. Consequently, managerial techniques of Teacher 2 which seemed to permit a rapid pace were investigated.

Time Management and Pace

Kounin (1970) was interested in the facets of teacher behavior that correlate with managerial success: managerial success was measured in terms of freedom from deviancy and student work involvement. The dimensions of teacher behavior that contributed to managerial success were withitness (the ability to communicate knowledge of events occurring in the room), overlapping, (dealing with two issues simultaneously),
smoothness and momentum (relating to the continuity of activities), group alerting and accountability (ability to maintain a group as opposed to an individual focus), valence and challenge arousal, (ability to secure enthusiasm for academic activities), and seatwork variety and challenge. Several of these dimensions reflect successful teacher management of time. Smoothness and momentum, in particular, address themselves to the problem of the continuity of activities. Teachers who pace fast are likely to find ways of maintaining smoothness and momentum. The fastest pacing teacher in this study (Teacher 2) had several techniques whereby she prevented slowdowns by the elimination of interruptions and maintained momentum by keeping all the students involved.

Smoothness. Kounin (1970) describes smoothness in a negative sense as the absence of jerkiness. Jerkiness was the outcome of teacher movement management mistakes, flip flops, dangles and truncations. All of these actions interrupted the lesson and were associated with decreased student work involvement. Fast pacing teachers likely have established techniques which enable them to avoid jerkiness and to maintain smoothness.

One particular lesson type where smoothness is difficult to maintain is the management of groups during reading lessons. Typically, teachers teach a group and require the remainder of the class to work by themselves. Interruptions occur from children doing seatwork as they seek
to clarify the nature of their assignments. Teacher 2 avoided this problem by spending approximately ten minutes at the beginning of every morning reviewing in detail how the work was to be done. After she had explained the assignment, she typically called upon a student to do the first exercise orally. Another technique was to have all students "read the exercise with your eyes" (silently), and to raise a hand to seek clarification. By these means this teacher ensured that she was not interrupted during her work with each of the reading groups.

This fast pacing teacher also avoided interruptions during group teaching time by assigning work associated with an easier reader to the remainder of the class. In this class each group eventually had a reader which was one half grade level easier than their instructional reader. The teacher commented:

It's good for them to have an easier reader. It makes reading fun for them and it keeps them busy while I'm working with the other group. They can do the questions easily so they don't have to bother me.

This fast pacing teacher also avoided interruptions during whole class recitations or group instructional time. She refused to recognize call outs, "You don't have a hand up", and curtailed stories. Young children typically like to supplement teacher talk with stories drawn from their own experiences which they think corroborates, or highlights, the point the teacher is trying to make. Frequently, other children become restless with personal stories because
extensive use of referential pronouns make the young child's meaning hard to determine. This teacher did not permit stories of a personal nature to interfere with the course of the lesson. She interrupted the child, pointed out "There isn't time now as the group is getting restless", and told the class that she would listen to their experiences at recess time.

**Momentum.** In Kounin's terminology momentum refers to the absence of slowdowns; slowdowns refer to behaviors that interfere with the forward motion of an activity. Most of the activities in this fast paced classroom were teacher directed. This teacher commented that the teacher was needed "to move things along". She said she was quite wary of child directed activities, indicating that long pauses led to restlessness. During a multiplication drill one child asked if a student could give the problems. The teacher responded, "I'll give them because I can do it faster". In spite of a predilection for teacher directed activities, the fast pacer did use children as leaders for some activities. These activities tended to be highly routinized with content which was already well known and which only required practice.

One way to keep things moving is by routinization. Routinization appeared often in the fastest paced classroom. Routinization of activities served to reduce the amount of structuring required of the teacher, and once initiated, made the activities self-sustaining. Two examples occurred in spelling. The children had to make up a riddle using one of
the list words. Once started the activity continued with minimal input from the teacher. The teacher selected the first child to read out his riddle to the class. That child picked someone to spell the answer. The responder, if correct, read out his or her riddle. As a final drill the class played a variant of Tic Tac Toe. This involved two teams. One member from each team went to the board and had to write a word which was dictated by the teacher. The fastest was permitted to put an X or an O on the board. While the winner was deciding where to place his X or O, the next pair went up to the board. From observation, it was possible to determine that the children were taking turns according to the seating plan. No time was lost in discussion about whose turn it was, and the teacher had to give no further directions once the game had been initiated. This game moved so quickly that in approximately ten minutes each child had had two turns.

Teacher 2 commented that successful activities were those which were fast moving, and in which there was a high level of student participation. She had several techniques which encouraged active participation and which contributed to a sense of momentum. One of the most frequent "group alerting" techniques (Kounin, 1970) was to invite the whole class to comment on a child's response; "Hands up who agrees, Is he right?" were typical ways of keeping students on their toes.

One frequent source of slowdowns in classrooms is the student who does not know the answer to a question. During
group reading lessons, typically this teacher posed a question, and had the group read silently to find the answer. She said this approach enabled her to move more quickly than the "round robin" approach. If a child did not know the answer she passed immediately to another child, explaining "Everyone should know if you've read the page". She commented that waiting for children to respond led to the others becoming restless, so she preferred to come back to the child on another question, rather than keep everyone waiting.

In this section aspects of the behavior of the fastest pacing teacher which were concerned with maintaining smoothness and momentum were described. Teacher 2 had developed techniques which reduced interruptions and permitted an efficient use of time. Management of time was seen as related to speed of pacing.

Concluding Discussion

In this chapter, it was argued that the teachers generally controlled the pace of instruction in a class. It was further demonstrated that most of the teachers paced homogeneously even when the classes were ostensibly grouped for instruction. Homogeneous pacing was interpreted as functioning to keep a class together. Several techniques for speeding up and slowing down different segments of the class, in order to facilitate homogeneous pacing, were reported. Techniques for maintaining smoothness and momentum which were features of the fastest paced class were described.

In chapter four the classroom phenomena of finishing
off and catching up were interpreted as functioning to keep the class operating as one organism. It was suggested that time spent on finishing off incomplete assignments reduced the total time available for learning new things. It was further suggested that this denial of opportunity to learn new material likely has differential impact; children who finish assignments quickly, and have to mark time while slower classmates complete work, are probably the most disadvantaged.

In this chapter, it was argued that a value preference for mastery functioned to keep the class operating at the same speed. Keeping the class together involves the reduction of coverage, a situation which has been associated with decreased student achievement (Arlin and Westbury, 1976; Good, Grouws and Beckerman, 1978). Reduction of coverage represents decreased opportunity to learn and the reduction in opportunity to learn is likely greatest for those students with high ability or low time requirements. Consequently, it is suggested that a mastery value preference is likely related to the leveling of student achievement because it reduces the opportunity to learn of those students who would have contributed the most to increased achievement variance.

It was further argued that limitations of time in school, and variability in student time requirements, combine to make coverage and mastery incompatible goals. Accordingly, if time is considered as a resource, it may be used to increase the mastery level of the class, or the amount of coverage, but not both. In this chapter, the teacher was
considered as a decision maker who intuitively had to balance coverage, mastery and time. Time used for mastery seems to address the needs of lower ability students, whereas time used for coverage seems to be directed at fulfilling the needs of higher ability students. The value preference exercise indicated a willingness to disregard time when mastery was concerned but not when coverage was considered. This was interpreted as corroborating the data collected by observation, and by interview, which indicated that teachers attenuated coverage in favor of mastery of fewer objectives.

The willingness to expend time in order to enhance mastery was interpreted as geared to the time needs of the slower students. The reduced coverage, which is a corollary of a mastery value preference, was seen as a decrease in opportunity to learn, especially for the faster students. Consequently, it is suggested that a mastery orientation will likely result in a class being kept together artificially. Ultimately, this is expected to be related to leveling, or reduction, of student achievement. In the next chapter, the idea of time as an educational resource is pursued further and how time is allocated to various groups of students is discussed.
CHAPTER 6

Time as an Educational Resource: The Teacher as Utilitarian Pragmatist

Implicit in the preceding chapters is the consideration of time as an important variable influencing classroom processes. Teacher decision making, regarding the organization and the pacing of instruction, was seen as related to the amount of time available for schooling, and to the differential time needs of students. In this chapter, an economic analogy is used to consider time in schools. Time is conceptualized, explicitly, as a resource which may be utilized by teachers to facilitate student learning. In this formulation the teacher becomes a resource manager. Resource management has been defined as:

a conscious process of decision involving judgement, preference and commitment, whereby certain desired resource outputs are sought from certain perceived resource combinations through the choice among various managerial, technical and administrative alternatives. (O'Riordan, 1971 quoted in Eggleston, 1977, p. 18).

In this view the teacher is regarded as a decision maker and the distribution of time as a resource is treated as a problem in decision making.

The conceptualization of time as a resource raises questions about supply and demand. It seems reasonable to argue that the paucity of time available for school learning makes time, potentially, a valuable commodity. Variability
among students in terms of time needs leads to the anticipation of competing demands. The combination of a limited resource and competing demands provides the necessary elements for a complex choice situation. It is further assumed that resources are deployed in order to reach certain goals or objectives. The objectives of the decision maker may be apprehended consciously or unconsciously, or the intended objectives may be quite different from the objectives which are realized. It is anticipated that an analysis of time allocation in classrooms may shed light on the goals which are actually realized.

Although the focus in this chapter is on the allocation of time in classrooms, the intent is to avoid a narrowly arithmetical investigation. The purpose of the chapter is to consider what the allocation of time reveals about classroom processes and to reflect on how time allocation decisions may be related to student outcomes. The chapter opens with the consideration of time as a commodity, and the literature regarding the application of an economic model to the relationship between time and achievement is reviewed. Next, it is proposed that time allocation may be considered as a problem in decision making, and an appropriate model for classroom decision making is discussed. Data from the five classrooms are presented, and interpreted as reflecting the image of the teacher as a utilitarian pragmatist. Time allocation decisions are seen as contributing to teacher utilities or satisfaction. It is argued that keeping the
majority of the children occupied is a major source of teacher utility.

Bloom (1974) suggested that time treated as an educational resource has two facets: how much time is available and how it is utilized. This bifurcation corresponds to a distinction in the current empirical literature between time allocated by the teacher for a particular task, and engaged time, or time used by a student in the pursuit of learning. It appears self-evident that children may not use the time allocated to them as wisely as teachers might wish. The concern in this chapter is how teachers allocate time; in chapter seven, how time is utilized by students is investigated.

This Janus like aspect of time, the separation of teacher allocation of time from student engaged time, did not always dominate educational writings. The writings of some early educators (Bagley, 1907; Morrison, 1927) clearly articulated the prevailing assumption that teacher behavior influenced or determined student behavior. Hence, the penchant for treating student attending behavior as an index of teacher efficiency. This early work is further pervaded with what in retrospect smacks of self-righteous smugness: the insistence that if the teacher did not determine student behavior then she ought to. Perhaps the modern separation of allocated from engaged time reflects the growing understanding that teacher intentions are not automatically fully realized in student behavior, and that a reciprocity exists between
teacher and student behavior in the classroom (Fiedler, 1975). Much of the early writing on the allocation of time is clearly prescriptive in intent and reflects a belief in the notion that time may be viewed as a commodity. This idea also dominates the current research work on the use of time in schools. The discussion which follows will trace the development of the idea of time as a resource in education.

**Time as a valuable commodity**

Interest in time as a consideration in educational matters developed in the late nineteenth century. Society generally, and education in particular, was marked by a consciousness of the ephemeral nature of time. Consciousness of the passage of time during the school day promoted increased interest in factors associated with fatigue (Arnold, 1911; Dutton, 1903; Sears, 1918; Seeley, 1903), and in determining the most productive work hours (Marsh, 1907). Time was seen as a commodity to be used wisely. Major educational concerns were with economy and efficiency of time use. Both teacher and pupil waste of time was considered morally reprehensible (Bagley, 1907; Bagley, 1917; Bennett, 1917; Dutton, 1903; Sears, 1918; Seeley, 1903; White, 1893).

Efficient use of time preoccupied the educators at the beginning of the twentieth century. The advent of "scientific management" in industry gave a huge impetus to the drive for economy and efficiency in education (Callahan, 1962). Fervent school trustees, desiring to reduce the cost of education
which had been significantly increased by the influx of immigrants, found a receptive audience in the new breed of educational administrators who were anxious to implement ideas imported from industry (Callahan, 1962).

Efficient use of time in education was seen as a problem of economy; the concern was with securing the largest return for the material investment of time, energy and money. Bagley's comments on classroom management are typical of the concern with efficiency:

The problem of classroom management has to do with the effective treatment of this "room" or unit-group of pupils. Primarily it is a problem of economy: it seeks to determine in what manner the working unit of the school plant may be made to return the largest dividend upon the material investment of time, energy and money. From this point of view classroom management may be looked upon as a "business" problem. The handling of children in masses is its central point of interest. How to secure the best results from the educative process carried on under this condition is the question for which it seeks an answer. (Bagley, 1907, p. 2).

Accordingly, reduction of waste became an all-consuming endeavor. Rice (1897) devoted considerable attention to time-saving devices. He proposed that the empirical study of efficient teachers would enable a rational resolution of problems regarding the judicious allocation of time to subjects. In his concern for efficiency, he proposed the elimination of non-essential subjects (Rice, 1896); the time saved was to be devoted to the study of essential subjects, a proposition which has the contemporary ring of core curriculum.
The conception of time as a valuable resource to be expended wisely had ramifications at the level of individual classrooms. The writers of the early textbooks in school management (Arnold, 1911; Bagley, 1907; Bennett, 1917; Currie, 1887; Dutton, 1903; Sears, 1918; Seeley, 1903; White, 1893) evidence an intense concern with the details of timetabling. Minutes must have been precious as every one during the day was accounted for in great detail.

The cult of efficiency led to a concern with routinization. Teachers, especially novices, were advised to reduce as much of the general business of the class to habit as soon as was possible. Organization, together with drill, was seen as necessary to ensure the formation of desirable habits (Breed, 1933). It is perhaps difficult for the modern reader to generate unrestrained admiration for the management practices (the passing of wraps and the movement of lines) which developed from the efficiency model of education, yet the notion of time as a commodity has commanded considerable attention from contemporary educators.

The relationship between time and achievement

It seems reasonable to accept that all learning requires the expenditure of time (Bloom, 1974). In the earlier work student learning was not in question: it was assumed to be the automatic outcome of time spent in school. A resurgence of interest in time as a variable of potential interest in educational research was documented by Rosenshine
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(1970). This newer work attempts to investigate the degree of the relationship between time and achievement. Modern concerns with time have been dominated by a metaphor borrowed from Economics, the production function model. The conception of time as a commodity links the newer work with the old.

The literature which has developed from a production function model of education seeks to determine the relationship between time in school and learning. As part of this investigation, a progressive refinement in how time in school is defined, may be noted. Initially, time in school was quantified at a gross level, hours of attendance, and gradually refined to the time a student spends actually engaged in academic tasks. Time spent on different types of tasks is discussed in chapter seven.

The Production Function Model

The production function model in Economics is concerned with achieving maximum output at a given cost, or minimizing cost for a given output. Applied to the educational domain the model is concerned with connections between school resources and achievement. Students are conceived of as the input and achievement is the output; the school becomes a black box where processing of the raw material (students) takes place. In this formulation, the processing assumes secondary importance. For ease in discussion, the operation of the production function model will be dealt with at two levels: macro refers to the operation at the school level, and
micro, to the operation at the class level.

Macro Level. Results of a large scale investigation of the influence of school characteristics on achievement were published in the Coleman report (1966). The conclusion that schools have no effect on achievement may be seen as stemming from the application of a production function model to education (Barr and Dreeben, 1977). Barr and Dreeben (1977) argued that the treatment of data at the school level masks important teacher-student variables; inputs and outputs are considered independently of the process of transformation.

The result of no effects was challenged by Wiley and Harnischfeger (1974). They quantified the school experience in terms of attendance, length of the school day, and length of the school year. Their calculations revealed large variations in average daily attendance. In a reanalysis of some of Coleman's Equality of Educational Opportunity data (1966), using school level regression coefficients, they related amount of time in school and achievement in basic subjects.

Karweit (1976) challenged the assertion that quantity of schooling, or amount of time in school, affects achievement. In their reanalysis of the Equal Educational Opportunity data Wiley and Harnischfeger utilized the results of forty inner city schools in Detroit. Karweit included the remaining thirty Detroit schools in her reanalysis. Regression coefficients were considerably smaller which led her to question the generalizability of the Wiley and
Harnischfeger findings. A further reanalysis of all the Equal Educational Opportunity data at grades 3, 6, 9 and 12, using the Wiley and Harnischfeger procedure, revealed some quantity of schooling effects. Karweit argued that these are of little practical value: raising achievement can only be accomplished by an exorbitant extension of the school day and year. In conclusion she raised three points. She questioned the assumption of linearity between quantity of schooling and achievement; she raised the question of the cumulative effect of absenteeism; and finally she pointed to the possibility that lack of exposure to schooling may have differential effects for particular students.

The literature on time and achievement seems to suggest that even if more time is allocated the actual increase in achievement may not be significant. From a production function point of view the allocation of extra time, beyond a certain level, may prove to be inefficient, in terms of increasing achievement, because of diminishing returns (Fredrick and Walberg, 1980).

Micro Level. Initial studies investigating time as an input resource at the classroom level have been largely descriptive. Much of the information on allocated time has been collected as part of the California Beginning Teacher Evaluation study. As part of this program Cahen and Fisher (1978) conducted an analysis of instructional time in Mathematics. They investigated the allocation of time to addition and subtraction and place value over a seventeen week
period. Teacher log books were used to assess allocated time. Allocated time varied considerably, from a high of 1263 minutes to a low of 201 minutes. In addition to variation in amount of time, there was also variation in the distribution of time. For example, some children received all their instruction in addition and subtraction prior to the tenth week. Differences in pattern of time allocation could be observed within classes as well as across classes.

Similarly considerable variation across classes was found by Filby, Marliave, and Fisher (1977) in Reading and Mathematics in grade 2 and grade 5. Harnischfeger and Wiley (1978) also studied instructional time at the grade 1 and 2 level. The range in time devoted to instruction varied from 56% to 95% of the school day. A further analysis of time spent in basic skills revealed wide variation among classes. In 47% of the classes the minimal recommended basic skills time allocation was not reached. Those classes which spent the least time in basic skills also spent the least time on other subjects.

Generally, these studies reveal wide discrepancies in time allocated to various academic subjects. However a major methodological difficulty exists in the use of teacher log books as estimates of time used. A recent review of teacher self reports (Hook and Rosenshine, 1979) indicated that teacher descriptions of their own behavior are not very reliable. These studies were admittedly exploratory in nature and descriptive in intent. However, an exploration of
discrepancies in time allocation might provide additional insights regarding classroom processes.

The impetus for the investigation of the allocation of time in schools was the suggestion that time and achievement are associated. Further work has indicated that it is not allocated time but student engaged time which is associated with increased achievement (Rosenshine and Berliner, 1978). Therefore, allocated time has come to be regarded as a necessary but not sufficient condition for student learning. Accordingly, student engaged time has assumed prominence in the classroom research literature, and the discrepancies in allocated time, revealed by previous research, have been largely ignored.

The interest in time-on-task as a variable is amply justified by the consistency with which it appears to be linked to achievement. However, it seems appropriate to suggest that the rush to investigate such a pragmatic relationship may have obscured a question of potential significance - the discrepancies in allocated time. If time is conceptualized as an educational resource and the teacher as a resource manager, then perhaps the allocation of the resource may illuminate some classroom processes and suggest possible explanations for the observed discrepancies.

**Time Allocation as Decision Making**

Time allocation by teachers may be seen to have two modes, the preactive and the interactive. Preactive time
allocation takes place during planning; as part of the planning process teachers have to allocate time over the long term (the allocation of time to a socials study unit), and over the short term (the allocation of time to the arithmetic lesson tomorrow). Preactive planning decisions concern the allocation of substantial amounts of time and are likely reflective in nature. In contrast, interactive decisions made during the process of teaching, are less open to reflection and generally concern the allocation of smaller amounts of time. Interactive time allocation decisions may be related to preactive decisions and may in fact modify them. For example, a teacher who planned to devote half an hour to reviewing long multiplication may discover early in the teaching sequence that the children have remembered the algorithm, and therefore curtail the lesson. On the other hand, interactive time allocation decisions may reflect a teacher's spontaneous response to perceived needs; for example, when unplanned help is given to individuals and groups.

The consideration of time allocation as decision making raises the question of the applicability of decision making models to this aspect of the work of the teacher. Although there are several approaches to the study of decision making, information processing, multiple regression, the application of Bayes' theorem (Shulman and Epstein, 1975) these may all be considered as variants of a basic model - the behavioral decision model.

The behavioral decision model has been criticised as
being a normative rather than a descriptive model; it suggests how people ought to make decisions. The fundamental assumptions underlying the model are that goals are identified, alternative means for reaching the goal are available, the probable consequences of each alternative are known, and the decision maker has a utility function or preference ordering that ranks all sets of consequences from the most preferred to the least preferred. In short, the basic theoretical core of the decision theory model is that human beings act in a rational manner. Further, the theory maintains that action will be chosen with a view to the maximization of expected value or expected utility. Underlying the principles of rationality and maximization of value or utility is the view that human behavior is governed by its consequences. This particular view has its genesis in a mechanistic philosophy which is fundamentally reductionistic; in a mechanical world external forces cause the action and prediction becomes possible in principle.

The assumption of rationality carries with it several implications. In order that a person might act rationally, a goal must be specified and alternative ways of attaining the goal must be available. The idea of the maximization of expected value or utility also implies that the consequences of the alternative courses of action are known, and that the decision maker can attach a value, either objectively or subjectively, to the outcomes.

A major difficulty with the behavioral decision model
is the assumption of rational behavior. From the viewpoint of internal consistency the model cannot be faulted: a rational choice, by definition, is the optimal decision. However, this tautology should not obscure the fact that many decisions, particularly classroom decisions, appear marked by irrationality. The instability and unpredictability of classroom events (Doyle, 1979; Jackson, 1968) suggest that a rational model, at least for interactive decisions, may not be tenable. The implications of this normative approach that goals are well known, means to achieve goals may be specified, and that some consensus exists as to the optimal alternative, continue to be moot points in educational circles.

The classical theory of rational man has been challenged by March and Simon (1958). Their major criticism was that this model does not accord well with commonsense notions of rationality. They argued that the model demands "objective" rationality in the sense that "real" alternatives, "real" consequences, and "real" utilities exist. They propose that human behavior is governed by "subjective" rationality:

The organizational and social environment in which the decision maker finds himself determines what consequences he will anticipate, what ones he will not; what alternatives he will consider, what ones he will ignore (March and Simon, 1958, p. 139).

They argued that:
because of the limits of human intellective capacities in comparison with the complexities of the problems that individuals and organizations face, rational behavior calls for simplified models that capture the main features of a problem without capturing all its complexities (p. 169).

Consequently, they proposed that choice is always exercised according to a simplified model of the real situation. Furthermore, the chooser's model is his definition of the situation. Accordingly, elements of a situation are not objective data, but are generated by the chooser and are the outcome of psychological and sociological processes, "including the chooser's own activities and the activities of others in his environment" (p. 139).

In the rational decision model the optimal alternative is always chosen. March and Simon (1958) argued that the criterion of optimization is too stringent to describe the choices of human beings. They contrasted optimal alternatives with satisfactory alternatives:

An alternative is optimal if: (1) there exists a set of criteria that permits all alternatives to be compared, and (2) the alternative in question is preferred, by these criteria, to all other criteria. An alternative is satisfactory if: (1) there exist a set of criteria that describes minimally satisfactory alternatives, and (2) the alternative in question meets or exceeds all of these criteria (March and Simon, 1958, p. 140).

They argued that human decision making is concerned with finding satisfactory alternatives as optimization involves a more complex search process. They also point out that the standards for "satisficing" are part of the definition of the
situation and therefore cannot be specified in an objective manner. As the chooser defines the situation so does he also define what are satisfactory alternatives.

In seeking to understand teacher allocation of time this view of "bounded" rationality is an attractive alternative to the classical theory of decision making. Firstly, the emphasis on the limitations of the information processing capabilities of human beings seems particularly appropriate given that classroom events are dynamic rather than static. Secondly, the emphasis on the choice of satisfactory rather than optimal alternatives seems appropriate given the complexity of the classroom environment. Thirdly, the model of bounded rationality posits that the elements of a choice situation are susceptible to environmental pressures and constraints: the activity of the chooser and of others in the environment may lead to a redefinition of the situation and consequently to different decisions. In this aspect, the model may be said to reflect an ecological orientation.

Behavioral decision theory evolved to explain and predict choices in the economic sphere: choice was seen as essentially rational. It is suggested that a model of bounded rationality may be more appropriate to describe time allocation decisions of teachers. The notion of bounded rationality, "administrative" man rather than "economic" man, does not necessarily imply a rejection of all the concepts associated with classical decision theory. It is argued that
within a bounded rationality framework some economic concepts, particularly the concepts of utility, marginal utility, indifference curves and equilibrium at the margin, are still useful ways of describing choice behavior.

**Time Allocation within an Economic Framework**

**Maximization of Utility**

The hedonistic view of behavior proposed by Jeremy Bentham maintained that all action was rooted in a desire to increase pleasure and to avoid pain. All objects could be considered in terms of their pleasure- or pain-giving properties. These properties were called utilities. Therefore all objects and actions could be viewed as having positive or negative utilities. Benthamites proposed that the goal of human behavior was the maximization of utility.

**Marginal Utility**

The concept of the maximization of utility found its way into the theory of economic choice (Edwards, 1954) where the idea of marginal utility was developed. The value of a commodity or resource is not considered to be fixed and depends upon how much of the commodity is possessed. The increase in utility that results from having one more unit of a commodity is called the marginal utility.
Indifference Curves

Early economists assumed that the utilities of various commodities were independent and that a total utility could be calculated by simple addition (Edwards, 1954). According to Edwards (1954) Edgeworth pointed out that total utility was not necessarily an additive function of the utilities attributable to separate commodities. He introduced the idea of indifference curves to deal with the problem of non-independent utilities. Indifference curves are used to study the preference for combinations of goods: each indifference curve represents a constant utility function. Consider that time in school may be used by a teacher for either marking or instructing. Suppose that the teacher gets the same amount of utility from 9-minutes-instructing-and-1-minute-marking as she does from 6-minutes-instructing-and-4-minutes-marking. Then these are two points on an indifference curve that the teacher may have for combinations of marking and instructing. It may also be the case that she is indifferent between 12-minutes-instructing-and-8-minutes-marking and 5-minutes-instructing-and-15-minutes-marking. These are represented by two points on another, higher indifference curve. A whole family of indifference curves is called an indifference map and presents a picture of relative preferences (Figure 1).
Equilibrium at the Margin

Utility theory predicts that people will prefer the combinations of goods which may be attained on their highest indifference curve. The only source of restraint is their consumption possibility line, or budget. In the example given above, the teacher's consumption possibility line is the amount of time available in a school day. Given that her only choices are instructing and marking, utility theory predicts that she will prefer the combinations of marking and instructing which is permitted by her budget line. This is called the point of equilibrium, the point of maximum utility and it occurs when the budget line is tangent to an indifference curve. The equilibrium point is reached when no further shift in the resources will bring increased benefits. Therefore, our hypothetical teacher is unlikely to reallocate her time to marking and instructing unless the consumption possibility line is increased or decreased. In the example,
the teacher had only to allocate time to marking and instructing. This simplification does not represent time allocation in classrooms, and should not obscure the complexity inherent in teacher time allocation decisions.

It is suggested that teacher time allocation decisions may be regarded within the framework of utility theory. However, it is argued that the dynamic nature of classrooms and the inherent complexity of classroom decision making suggest that teachers may satisfice rather than optimize. In other words, teacher behavior may be expected to reflect a pragmatism which arises from the constraints of the classroom environment.

According to Dreeben and Thomas (1980) a fundamental problem with the application of the production function model in schools is that it has not taken the nature of the environment into account. The production functions of individual children are considered to be separable. In other words, the input to one student is considered to be independent of the input to another. In the context of this study, the allocation of time to one student would not influence the allocation of time to another. This reflects a tutorial model of education which Barr and Dreeben (1977) rejected as not reflecting the collective nature of schooling. Brown and Saks (1980) argued that the relationship of inputs to outputs for individual students is not independent as students share the same inputs. In the context of this study, this means that teacher time has to be shared by many
students. Consequently, the assumption of homogeneous inputs and outputs, underlying the production function model, is questionable when applied to classrooms: classroom inputs and outputs may be either homogeneous or heterogeneous. In the next section, the nature of classroom time inputs will be examined and the possible ramifications for output considered.

Before proceeding, the assumptions underlying the following argument need to be explicated. It is assumed that the manner in which time is apportioned to students is at least partially dependent on teaching strategies. In other words, it is assumed that the allocation of time to students is reflected in the choice of instructional formats (whole class, small groups etc.). Furthermore, it is assumed that decisions regarding the allocation of time reveal the structure of teacher preferences. Consequently, in the next section, how the allocation of time reflects a relative preference for coverage or mastery, is considered. Firstly, it is suggested that time can be spent on activities which will increase or decrease curricular coverage. This proposition directs attention to how time is allocated to curricular or non curricular activities. Secondly, it is suggested that the time a teacher devotes to instruction may be influential in determining the opportunity to learn for students. Consequently, how much time is spent on instruction, and how much instructional time is apportioned to different groups of children, will be investigated.
Allocation of Time to Curricular and Non Curricular Activities

It was suggested earlier that allocated time is a necessary but not sufficient condition for learning to take place. Accordingly, the amount of time available for learning was investigated. All the classes were in session for 160 minutes during the morning, and the time was spent in curricular or non curricular activities. Curricular activities took place in the classroom and were related to traditional school subjects, reading, spelling, language, arithmetic, socials and science: curricular activities are not necessarily academic as they may include listening to stories or drawing pictures. Non curricular activities generally took place in the gym and included assemblies, puppet shows, the fire department show and practices for the Christmas concert. Table 13 shows the percentage of time during each observation period that was spent on non curricular activities.
Table 13

Percentage of Time Spent on Non-curricular Activities

<table>
<thead>
<tr>
<th>Visit</th>
<th>Class 1</th>
<th>Class 2</th>
<th>Class 3</th>
<th>Class 4</th>
<th>Class 5</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>34</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>9</td>
<td>0</td>
<td>19</td>
<td>36</td>
<td>19</td>
</tr>
<tr>
<td>4</td>
<td>69</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>5</td>
<td>16</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>8</td>
<td>0</td>
<td>31</td>
<td>44</td>
<td>0</td>
</tr>
<tr>
<td>7</td>
<td>19</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>100</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>9</td>
<td>63</td>
<td>0</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>63</td>
<td>-</td>
</tr>
</tbody>
</table>

It is apparent that in two of the classrooms a considerable amount of the available time was allocated to activities which were not directly related to the curriculum. In the case of Class 1 the allocation of time to non-curricular activities took place on a regular basis, and appears to reflect the philosophy of the integrated day to which the school subscribed.

Allocation of time to curricular and non-curricular activities may be influenced by pressures which are external to the classroom. The availability of puppet shows and a fire department show led to the redistribution of time in four of the five schools. Two of the teachers also redistributed
their time to accommodate practices for the Christmas concert. Christmas concerts and puppet shows are usually cooperative ventures, agreed to by a staff, and therefore may not reflect the preferences of individual teachers. Allocation of time to instruction within the classroom seems more reasonably attributed to individual teacher preferences. Therefore, the following discussion will focus on the distribution of time within the classroom on the assumption that it reflects the responses of individual teachers.

**Allocation of Time to Instruction**

One facet of the time spent on curricular activities was the amount of instruction that took place. Instruction in a school setting is generally used to refer to that activity whereby an adult interacts with a child or children with the express purpose of helping them acquire information or skills which they did not have previously. Furthermore, this activity is usually characterized by deliberateness and has a definite logic and progression to it. Instruction is on-going in the sense that the teacher expects to continue from where she stopped at a later time. Instruction is to be contrasted with other kinds of teaching functions—marking, helping, monitoring work, managing behavior, providing supplies, and giving directions. Time spent on instruction was generally preceded by the teacher announcing to the class what they were going to do, or by calling on a particular group to be prepared. The end of instruction time with the whole class
was usually signalled by an announcement to begin the assigned work; end of instruction time with a group was usually signalled by the dismissal of the group to their seats. Table 14 provides a summary of the percent of time in the classroom which was used for instruction. Teachers in the sample differed quite noticeably in the amount of time they spent instructing. Only two of the teachers (1 and 2) devoted more than 50% of their time in the classroom to instruction.

Table 14

Percentage of Time in Classroom Spent in Instruction

<table>
<thead>
<tr>
<th>Visit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
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<tbody>
<tr>
<td>1</td>
<td>58</td>
<td>67</td>
<td>23</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td>2</td>
<td>50</td>
<td>75</td>
<td>16</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td>68</td>
<td>42</td>
<td>0</td>
<td>22</td>
</tr>
<tr>
<td>4</td>
<td>90</td>
<td>39</td>
<td>10</td>
<td>17</td>
<td>33</td>
</tr>
<tr>
<td>5</td>
<td>61</td>
<td>71</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td>6</td>
<td>70</td>
<td>62</td>
<td>20</td>
<td>3</td>
<td>23</td>
</tr>
<tr>
<td>7</td>
<td>59</td>
<td>78</td>
<td>53</td>
<td>33</td>
<td>0</td>
</tr>
<tr>
<td>8</td>
<td>0</td>
<td>60</td>
<td>50</td>
<td>41</td>
<td>23</td>
</tr>
<tr>
<td>9</td>
<td>58</td>
<td>69</td>
<td>39</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td>10</td>
<td>-</td>
<td>-</td>
<td>68</td>
<td>0</td>
<td>-</td>
</tr>
<tr>
<td>Average</td>
<td>54</td>
<td>66</td>
<td>32</td>
<td>17</td>
<td>19</td>
</tr>
</tbody>
</table>

In Table 14 instructional time was calculated as a percentage of the time spent in the classroom. This may not accurately reflect the status of instruction in some
classrooms as the percentage of instruction is inflated by decreasing the amount of time spent on curricular activities. As elementary school teachers have considerable flexibility in timetabling, the amount of instruction was recalculated as a percentage of the time which was scheduled for curricular activities. The results are displayed in Table 15.

Table 15
Percentage of Time Scheduled for Curricular Activities Spent in Instruction

<table>
<thead>
<tr>
<th>Class</th>
<th>Visit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
<td>44</td>
<td>67</td>
<td>23</td>
<td>31</td>
<td>39</td>
</tr>
<tr>
<td></td>
<td>2</td>
<td>31</td>
<td>75</td>
<td>16</td>
<td>0</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>3</td>
<td>40</td>
<td>68</td>
<td>34</td>
<td>0</td>
<td>18</td>
</tr>
<tr>
<td></td>
<td>4</td>
<td>28</td>
<td>39</td>
<td>10</td>
<td>17</td>
<td>29</td>
</tr>
<tr>
<td></td>
<td>5</td>
<td>51</td>
<td>71</td>
<td>0</td>
<td>25</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>6</td>
<td>65</td>
<td>62</td>
<td>14</td>
<td>2</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>7</td>
<td>36</td>
<td>78</td>
<td>53</td>
<td>33</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>8</td>
<td>0</td>
<td>60</td>
<td>38</td>
<td>41</td>
<td>23</td>
</tr>
<tr>
<td></td>
<td>9</td>
<td>22</td>
<td>75</td>
<td>39</td>
<td>17</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>10</td>
<td>-</td>
<td>-</td>
<td>68</td>
<td>0</td>
<td>-</td>
</tr>
</tbody>
</table>

Average 35 66 30 17 19

It is apparent that only Teacher 2 spent more than 50% of the time scheduled for curricular activities in instruction. The instructional time in Class 1 has dropped from 54% to 35%. The seemingly high level of instruction for Class 1, displayed
in Table 14, is merely a function of decreased time in the classroom.

Discussion. In view of the time devoted to finishing off and catching up, which was documented in chapter four, the small amount of time devoted to instruction is not surprising. However, its significance requires some discussion. It might be argued that both instructional time and independent study, or seatwork, are necessary conditions for learning to take place. Instructional time and independent work time may be considered as input variables in a production function model of learning. Accordingly, one may ask about the extent to which they may be substituted for each other. In other words, how much of student time would be required to make up for the loss of an amount of instructional time. This exchange between variables is known as the marginal rate of substitution (Brown and Saks, 1980). Brown and Saks (1980) pointed out that in a production function, it gets harder to substitute for an input variable, the more it is reduced. In the case of naive learners, without access to instructional material, which seems to be a fair description of elementary school children, it might be questioned if students are in any position to compensate for the loss of instructional time. If this analysis is correct, then a decrease in time allocated to instruction may function to reduce the speed of curriculum coverage. In effect, time allocation becomes another strategy to equalize curriculum coverage and to level output differences.
The analysis may be pressed further. Consider that high achievers are likely better able to substitute independent work for decreased instructional time whereas low achievers would have greater difficulty. If lower achieving students, because of deficits in knowledge, prerequisite skills, and poorer work habits generally, require a greater marginal rate of substitution, in order to prevent increased output variance, a higher allocation of instructional time to them would be predicted. This hypothesis was tested by investigating the allocation of time to instructional units.

Allocation of Time to Instructional Units

It has been argued that pressures external to the classroom, such as extra-curricular cultural events, influenced the amount of time that was allocated to curricular activities. In this section, it is suggested that forces internal to the classroom influence how instructional time is allocated to the various units within the classroom. Instructional units are the whole class, subgroups within the class and individual members of the class. Because individual instruction was not used by the sample of teachers in this study, only whole class and group teaching are considered in this section.

It was argued earlier that the classroom represents an environment in which production functions have characteristics of jointness rather than separability. In other words, the collective nature of classrooms influences how time is spent:
spending time on one activity or with one instructional unit precludes the spending of time on other activities or with other instructional units. One of the implications of the condition of jointness is that inputs are not necessarily homogeneous in nature. In the context of this study, this analysis suggests that teachers may allocate time to students equally (homogeneous input) or unequally (heterogeneous inputs). Consequently, it becomes appropriate to raise questions about how instructional format influences the homogeneity or the heterogeneity of resource allocation.

It has been suggested that the significance of homogeneity or heterogeneity with respect to input lies in how it influences output, or student achievement. Emerson (1979) argued that:

the more we treat people equally, the more we increase their inequality. Conversely, if we want people to end up with equal status, equal positions, and equal achievements, we must treat them in an unequal manner (p. 53).

One might argue analogously that the allocation of equal time to students with differing time needs will lead to unequal learning outcomes. Conversely, if the objective is to have all students reach a common goal then it will be necessary to allocate time to them, unequally, and in accordance with their time needs. In other words, Emerson is suggesting that the maintenance of individual differences in learning (or heterogeneous output) is accomplished by homogeneity of input (equal time). Conversely, the reduction of individual
differences (or homogenoeus output) is accomplished by heterogeneity of inputs (unequal time). An examination of the time spent in whole class teaching and group teaching was undertaken to determine the homogeneity or heterogeneity of resource allocation in the five classrooms.

Homogeneity of input means that all students have the same amount of teacher time, a situation which exists when the class is taught as a whole. For the most part this situation existed in arithmetic and spelling. (Class 3, where children worked at centers, was the exception). It might be argued that, teaching the class as a whole represents homogeneous input. The same expenditure of teacher time would be expected to realize different outcomes for individual students, because of differing time needs. Consequently, whole class teaching might be expected to increase achievement variance or heterogeneity of output. However whole class teaching need not necessarily lead to increased variability. Time may be held constant for all students, but if the rate of exposure to new material is slow, then variability among students would not be expected to increase. If the pace of instruction in whole class teaching is geared to the needs of the slower students, as argued by Dahloff (1971) and Lundgren (1972), then achievement differences between students would be expected to decrease. Homogeneity of inputs, or whole class teaching, would be expected to be related to decreased coverage. It will be recalled from chapter five that all the teachers reported a reduction in coverage in arithmetic. In
that chapter, it was argued that a mastery orientation functioned to equalize coverage, thereby maintaining an equilibrium between fast and slow workers. Contrary to Emerson's view (1979) of the effect of equal treatment, it is argued that homogeneity of time inputs, which occurs when the class is taught as a whole, likely contributes to the reduction of coverage which may function to level differences among students.

Allocation of Time to Reading Groups

Conversely, heterogeneity of inputs mean that students are treated differentially with respect to teacher time, the potential for which is provided by grouping the class for instruction. For the most part, this situation existed in reading. It is possible to analyze group teaching from the perspective of homogeneity and heterogeneity of inputs and outputs. If teachers allocate time to groups equally then the existance of individual differences in time requirements enable the prediction that variability will increase. Unequal allocation of time likely leads to increased variability when more time is given to higher achieving children. More time to lower achieving children is likely to decrease variability as it reduces the opportunity to learn of the faster students.

Group teaching provides for heterogeneity of time inputs. Brown and Saks (1980) argued that efficiency requires that resources be allocated where the additional payoff (marginal utility) is greatest. If the previous analysis,
that classroom processes operate to equalize outcomes by decreasing achievement variance, is correct, then one would predict that the greatest marginal utility would be realized by the allocation of time to students in the lower groups. Conversely, attempts to differentiate outcomes, by increasing achievement variance, will be reflected in greater time to students in higher groups.

Table 16

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Class</th>
<th>Gr.1</th>
<th>Gr.2</th>
<th>Gr.3</th>
<th>Gr.4</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>6</td>
<td>25 (7)</td>
<td>39 (10)</td>
<td>37 (3)</td>
<td>-</td>
</tr>
<tr>
<td>2</td>
<td>0</td>
<td>49 (17)</td>
<td>50 (6)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>4</td>
<td>31</td>
<td>30 (13)</td>
<td>39 (10)</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>5</td>
<td>0</td>
<td>18 (13)</td>
<td>21 (5)</td>
<td>21 (3)</td>
<td>41 (3)</td>
</tr>
</tbody>
</table>

Note number of students in each group are in parentheses

**Discussion.** Allocation of time during reading instruction, to the class as a whole and to groups, is displayed in Table 16. Only the teacher of Class 2 appears to have distributed time equally to both of her groups. The others distributed time unequally: teachers 1, 4 and 5 allocated greater time to the lower groups. As these groups generally consisted of fewer children, a small percentage of each class was being allocated the largest percentage of instructional time in reading. This observation also holds for Class 2, where although time was allocated equally, the
lower group consisted of many fewer children. The analysis in terms of marginal utility permits the conclusion that time to lower groups will function to equalize outcomes. Consequently, it is suggested that differential allocation of time to reading groups likely functions to establish an equilibrium between better and poorer readers.

A decision to teach the class as a whole simplifies time allocation decisions. A decision to group for instruction makes the allocation of instructional time more complex: the teacher has to decide how to distribute the time available amongst the groups. It has been suggested that basic social philosophical positions of elitism or egalitarianism are reflected in teacher time allocation decisions (Arlin, 1979). An alternative explanation is suggested by economic theory. In economics it is recognized that a limitation of resources will depress demands but also that dynamic demand serves to create or attract resources. Byrne (1976) has suggested that resource allocation is influenced by two kinds of demands, explicit and implicit. Explicit demands are from individuals or groups who know what they want and ask for it; implicit demands represent needs of people who are unable or unwilling to ask for themselves. It seems reasonable to suggest that both explicit and implicit demands for instruction may influence the allocation of time to students.

The immaturity of elementary school children suggests that the concept of implicit, rather than explicit, demand may
be appropriate to an understanding of instructional time allocation. Children who need more time to learn in effect may create an implicit demand for teacher instructional time. This analysis suggests that teachers would spend considerable time with the whole class and with the lower achieving children: this appears to have been the case in at least four of the five classrooms. It is suggested that this implicit demand also underlies the mastery orientation reflected in teacher pacing decisions.

Up to this point implicit demands for teacher instructional time have been considered from a strictly academic or instructional perspective: it has been suggested that lower achieving children will be allocated more time because they need it in order to cover the material. It is equally conceivable that teachers spend more time with these children because classroom management requires it. Grouping for instruction poses the problem of the supervision of the groups not receiving instruction. Lower achieving children may find it more difficult to sustain independent seatwork than higher achieving children. Consequently, teachers may find it more difficult to supervise lower, as opposed to higher, achieving children during seatwork sessions. More instructional time allocated to lower groups, as well as more time spent with the class as a whole, may function to reduce management problems. The combination of management and academic issues may function to create an implicit demand which results in greater instructional time being allocated to
lower achieving children.

The concentration on the implicit demand for the resource of teacher instructional time does not preclude the existence of explicit demands. For the most part, time allocation to the whole class and to groups for the purpose of instruction represented preactive decisions which have been interpreted as reflecting implicit demands. On the contrary, time allocated to an individual student was generally the result of an interactive decision, and sometimes reflected a response to an explicit demand. Explicit demands for teacher time was seen most clearly in those classrooms where students left their seats in order to gain teacher help. In some rooms, children needing help formed groups-in-waiting around the teacher. In other rooms, the children were required to continue working until it was their turn. Even in the one room where explicit demands were carefully controlled by the routine of the teacher circulating and giving help in an orderly fashion, the teacher still remarked that some children demanded, and got, more of her time than other children; the children who were named were children from the slower reading group.

Concluding Discussion

In this chapter time was viewed within an economic framework and time allocation was treated as a problem in decision making. Time was considered as a limited resource and how it was utilized to realize objectives was considered.
It has been suggested (Arlin, 1979) that perhaps teachers do not consider time as a scarce resource to be used wisely but as something to use up. Accordingly, time in classrooms may appear to be wasted. What has not been recognized is that assessments of time use involve value judgements which are influenced by preference structures. It seems more appropriate to evaluate the deployment of time as it relates to the goal realization of teachers. It may be argued that the goals or objectives of teachers might be quite different from other people (for example educational researchers), and that in terms of teacher preference structures, time is not wasted but is used wisely.

In the previous chapter, it was argued that teachers seemed to prefer to use time to increase the mastery level of the class rather than to increase coverage. If it is accepted that the speed of group progress more likely reflects the capabilities of the slower rather than the faster members, then the allocation of time to the whole class may be seen as more likely to realize mastery than coverage. Additionally, the differential allocation of time to groups within the classes is likely to reduce coverage further because the time available has to be shared. Consequently, it is argued that the allocation of time reflects the preference of teachers for mastery, and from the perspective of realizing their goals, time may not be wasted, but may be used wisely.

A theme underlying the previous argument is the notion that wise use of time has been evaluated according to how well
it realizes the manifest function of schooling, the enhancement of student learning. It has been pointed out previously that the notion of fulfilling the potential of individuals is perhaps idealistic rather than practical, given the collective nature of schooling. Enhancement of learning represents a rational objective for teachers; enhancement of teacher utility, via the reduction of management and instructional problems, is probably a more realistic goal. It was argued that classroom decision making is perhaps better reflected in a model of "bounded" rationality where satisficing rather than optimizing assumes greater importance. It is suggested that teacher decision making regarding time allocation represents satisfactory rather than optimal solutions to the problem of managing classes of students with differential time needs. It is worth considering that much of classroom time allocation behavior may reflect the desire of the teacher to avoid situations which create "pain" for her and to structure situations which accord "pleasure" for her. In terms of classroom management, it is critical to keep most of the class occupied. Yet lower achieving children cannot progress through the curriculum at the speed of the higher achievers. Faced with this dilemma, it is suggested that teachers seek a solution which establishes an equilibrium between the time needs of lower and higher achieving children.

It is suggested that the teacher as utilitarian pragmatist opts for a course of action which satisfices rather than optimizes. Efficiency requires that resources be
allocated where the marginal utility is highest. The allocation of time to lower achievers, via whole class teaching or by group teaching, is interpreted as reflecting teacher marginal utilities. The deployment of resources in this fashion is likely to reduce achievement variance. Therefore, it is argued that time allocation decisions are likely not to lead to the optimization of learning for individual students, but may optimize learning for the class as a whole. Consequently allocation of instructional time to the whole class and to groups may represent a satisfactory, rather than an optimal, solution to the problem of differential time needs.

A continuing theme underlying many of the arguments in this chapter, and in previous chapters, is that teacher behavior may not reflect a focus on learning. Doyle (1979) and Jackson (1968) have suggested that the behavior of the teacher in the classroom is better understood in terms of soliciting student cooperation rather than student learning. Student cooperation likely represents satisficing. Student engagement in classroom activities may be considered as a necessary but not sufficient condition for learning to occur. Consequently, it seems reasonable to consider that teachers may allocate time more with a view to maximizing participation rather than to enhance student learning. In the next chapter, the question of student cooperation as measured by on-task rates is examined in depth.
CHAPTER 7

Time-on-task

In the previous chapter time was considered as an educational resource and its allocation at the classroom level was considered in some detail. An examination of time allocation in the five classrooms was interpreted as revealing a mastery preference which likely functions to reduce achievement variance. However allocated time, as suggested by Bloom (1974), is only one facet of time as an educational resource. In this chapter, the second facet, student engaged time, is considered.

Engaged time has been viewed as a significant variable in schooling because of its relationship to achievement (Rosenshine and Berliner, 1978). The time allocated to a subject or activity provides a boundary or limit to potential learning, but it is student attention to curricular materials which determines the extent of learning. Consequently, Rosenshine and Berliner (1978) argued that:

Teachers who make a difference in students' achievement are those who put students into contact with curricular materials and find ways to keep them in contact (p. 12).

Therefore, it seems appropriate to discuss the extent to which teachers are able to manipulate or control student attention.

One of the assumptions underlying the discussion in chapter six was that time allocation was determined by choice.
of instructional strategy. Consequently, instructional format was thought to be significant in terms of resource allocation. Similarly, with respect to student engaged rates, it is assumed that some classroom practices promote more effective use of time than others. For example, the direct instruction model (Rosenshine and Berliner, 1978) has been identified as increasing student attention to the task at hand. Additionally, one might argue that particular activities and assignments might be more successful in securing student attention than others. Teaching strategies, and type of activities and assignments, are primarily the result of decisions made by teachers. Consequently, it is proposed that student time-on-task is potentially manipulable by teachers.

The idea that teachers can control student attention is certainly not new; the notion of the teacher as responsible for student engagement rates is implicit in much of the early literature on student attention. However, it is probably fair to comment that gaining and maintaining student attention was generally considered to be accomplished directly by the teacher in his interactions with students. The idea that teachers directly manipulate student attention is also current in contemporary books written for teachers-in-training (for an example see Good and Brophy, 1978). An elaboration of this notion is also present in Doyle's work (1979) regarding the means by which teachers elicit student cooperation. The idea of direct control of student attention is perhaps a limited view of the power of teacher influence. What is suggested
above is that teachers may have considerable indirect influence on student attending rates by the selection of particular activities and assignments.

In the previous chapter, the marginal rate of substitution between instructional time and student independent work time was discussed. It was suggested that high achievers were probably better able than low achievers to substitute independent work for decreased instructional time. It was argued that the allocation of greater instructional time to the class and to lower groups, in effect, served to compensate for the greater marginal rate of substitution of high achievers, and functioned as a leveling or equalizing strategy. If high achievers have a greater marginal rate of substitution, this should be reflected in higher on-task rates. Higher on-task rate is related to increased achievement which would lead to the sharpening of differences among students rather than a leveling. Yet the evidence presented so far has been interpreted as reflecting a mastery orientation which functions to establish an equilibrium between faster and slower students. In this chapter, on-task rates are investigated to see whether the equilibrium hypothesis is corroborated.

The purpose of this chapter is to examine on-task behavior in classrooms. The organization is historical in that the early literature on student attention is considered before the later work on time-on-task. This literature review is intended to provide a context for the examination of on-
task behavior in the five classrooms observed in this study. A continuing theme in the present work has been that teachers face the dilemma of getting children who differ in time needs through a standard curriculum in a limited amount of time. This problem manifests itself in classrooms as the phenomenon of fast and slow workers. Consequently, student on-task rates are worthy of study. The assumption is that as student use of time is potentially manipulable by teachers, patterns of on-task behavior within classrooms are likely to shed light on how teachers cope with the fundamental problem of individual differences in time needs.

The Use of Time by Students

Student Attention

Research interest in student attention, of which Morrison (1927) was in the vanguard, persisted until Shannon's (1942) study which challenged the validity of attention measurement. Jackson (1968) suggested that the demise of this line of research resulted not so much from Shannon's criticisms but because the idea of trying to keep student attention had an aura of authoritarianism which ran counter to the prevailing zeitgeist during World War Two. The early writers (Blume, 1927; Bjarnson, 1925; Brueckner and Ladenburg, 1933; Morrison, 1927) certainly had no compunction in regarding student attention as the responsibility of the teacher. Hence, they probably felt justified in using
attention scores as an index of teacher efficiency.

A fundamental assumption underlying much of the research work of this period was articulated by Rice (1897):

the time at the disposal of the teacher will not be fully utilized unless the mind of every child is at work (p.711).

Attention was perceived to be a necessary prerequisite for learning, therefore sustaining student attention was seen to be a major responsibility of the teacher. To Morrison and his colleagues the mind of every child at work implied:

sustained attention to the work in hand, from the moment when the opening bell rings until that at which the closing signal is given. (Morrison, 1927 p. 126).

Their writings reflect the belief that 100% attention was not only desirable but attainable. Therefore, the degree of attention was regarded as an index of the quality of instruction (Brueckner and Ladenberg, 1933).

Although Brueckner and Ladenberg (1933) speak of the quality of instruction, in the sense of content presented to the students, this issue was never addressed. The fundamental question, attention to what, or for what purpose, never seems to have been seriously raised. Rather the assumption seems to have been that the content teachers presented to children was important and worth learning; the problem lay in helping teachers with techniques of management which would secure increased student attention. Poor attention was seen as stemming from poor control techniques, not inappropriate
content. In order to improve the quality of teaching, supervisors were exhorted to demonstrate to teachers the quantity of attention in their classes:

Poor control technique as revealed by attention scores may be the result of faulty methods. The writer's attention was called to a particularly low attention score secured in an English class in which the instructor had sentences placed on the blackboard that were to be corrected by the pupils. The procedure followed was to send a pupil to the board to make the needed corrections while the remainder of the class observed. Long pauses followed while the pupil at the board struggled with his task. The instructor centered her attention on the struggling pupil with the result that the procedure proved wearisome to the class and inattention became general. The low scores proved the ineffectiveness of the procedure (Blume, 1929, p. 50).

The substance of the lesson is not discussed, although it seems likely that the subject matter of the lesson was too difficult for the pupils. Quality of instruction appears to have been synonymous with quantity of attention.

This early work addressed matters of technique (principally how to measure attention), rather than matters of substance (is the content worth attention?): this emphasis on technique, rather than substance, harbingered the subsequent decline of interest in this line of research. Morrison (1927) gave detailed information as to how the attention score of a class was to be determined. Originally, the class was scanned each minute and the number of children in and out of attention was recorded. As befits researchers dominated by the pursuit of efficiency, eventually the question was asked:
Is it necessary to make the count of pupils at one-minute intervals? (Brueckner and Ladenberg, 1933, p. 371).

They proceeded to determine how "reliable" the scores were at two, three, four and five minute intervals. Only one observer was used and reliability in this case seems to refer to how consistently the observer rated the students' attention during the lesson. As such, the study is more accurately described as an attempt to determine the time interval which most accurately reflects the attentional state of the class.

Ultimately, it was not the mechanics of assessing attention which proved to be the Achilles' heel of this line of research. An experiment by Shannon (1942), which demonstrated that some students did as well on material covered during periods of inattention as they did during their attentive periods, raised the question of the validity of the attention measures. Apparently, this study made explicit the distinction that looking attentive is not necessarily synonymous with being attentive, to the extent that researchers rejected the idea of observable behaviors as valid indices of the attentional states of their subjects.

In spite of the fact that visual aspects of student behavior were rejected in favor of covert thought processes (Bloom, 1953), the picture of classrooms provided by these early researchers is more than interesting. Accepting that the distinction between looking and being attentive is legitimate, the classrooms used as the basis of these early observational studies are remarkable in that a high frequency
of attending behaviors seems to have been standard. Average rates of attending behavior of above 80% are common. In Brueckner and Ladenberg's study of 78 classes (1933) average rates of attending behavior were 90% or higher. These uniformly high rates of attention provide information which is somewhat discrepant with the result of recent time-on-task research.

**Time-on-task**

It is important to recognize that the allocation of time to a particular subject does not guarantee conscientious utilization by students. This distinction between allocated or elapsed time, and actual use of time for academic pursuits, has been recognized in the literature. Rosenshine and Berliner (1978) argued that two student variables, content covered or "opportunity to learn", and student attention, show a higher correlation with achievement than traditionally studied teacher variables. Rosenshine and Berliner (1978) combined these variables into the concept of academic engaged time. Academic engaged time refers to the time students spend involved with academically relevant materials.

The Beginning Teacher Evaluation Study provided extensive data on student engagement rates. Berliner (1976) and his colleagues at the Far West Laboratory further refined time-on-task to include an estimate of the level of difficulty of the work. They define Academic Learning Time (ALT):
as on-task or engaged time by students, interacting with materials or participation in activities of intermediate level difficulty, that are academically focused. Thus ALT is a concept that has three defining characteristics: engagement, difficulty level and content. The measurement of ALT is in hours, minutes and seconds. A student accumulates ALT for example, when engaged with, say, reading workbook pages on decoding blends that are neither too hard nor too easy for the student. If the workbook exercise or lesson is judged by the observer to be too difficult for the student, or is judged as an easy task that merely fills time, ALT for that student is not accumulated (Berliner and Tikunoff, 1976, p. 3).

ALT was found to be positively related to student learning.

Researchers at the Far West Laboratory, Filby, Marliave and Fisher (1977), found wide variation in engagement rates in both reading and arithmetic at the second and fifth grade levels. In general engagement rates were considerably lower than in the studies conducted in the earlier part of the century; engagement rates averaged 50% with a range of 37% to 74%. Filby, Marliave and Fisher (1977) also noted considerable variation in on-task behavior within classes. The lowest engagement rate for an individual student was 23%; the highest was 91%. They reported that within each class there was at least a 30% difference between the lowest and the highest rates. Variation in on-task behavior among classes was noted by Good and Beckerman (1978). In this study of grade six classes the range in student engaged behavior among classes was 68% to 82%.
Individual Differences in Time Use

The variation in on-task rates within classes was investigated by Good and Beckerman (1978) who conducted a naturalistic study of the relationship of academic engaged time to three levels of achievement. Their purpose was to determine how type of subject matter and activity influenced time-on-task, for pupils of high, middle and low achievement. Three grade 6 classrooms, in two schools, were observed for a total of fourteen hours each. Time on-task was ascertained by observing each pupil individually. The results indicated that high achievers spent more time on-task than low achievers. A major factor influencing involvement was the type of task. Pupil chosen work led to task rates of 34%, while on-task for teacher assigned work was 77%. Setting was also important. On-task was highest in teacher-led small groups and lower for whole class and individual activities.

This study suffers from two methodological defects. Assignment to achievement levels was done according to teacher ratings. Consequently, it is impossible to know precisely what achievement levels are represented by these groups; standardized assessment procedures are preferable when comparing across classes. Additionally, it is not clear if the on-task rates for the teacher-led small groups was reported independently of the on-task rates for the class as a whole.

A further refinement of student use of time was achieved in a study by Arlin and Roth (1978). Time on
reading, either books or comics, was calculated for good and poor readers, and related to subsequent achievement in reading. An interaction between students and type of reading material was demonstrated, such that poor readers achieved significantly less when exposed to comics. Both the Good and Beckerman (1978) study, and the Arlin and Roth (1978) study, indicated not only the importance of student attention to academic tasks, but also that type of task may be influential.

The literature on student engagement rates supports the contention that students direct attention to academic activities differentially. Type of activity may also influence student attending rates. In particular, a high degree of teacher direction or adult supervision appears to be related to on-task behavior. Consequently, it might be anticipated that classes in which children spend a greater amount of time in activities directed by the teacher will have higher on-task rates. Conversely, classes in which children spend less time in teacher led groups are likely to have lower on-task rates.

The argument that time spent with the teacher is related to increased on-task rates may have ramifications for organizational practices. Consider that grouping classes for instruction reduces the amount of time an individual student spends in teacher led groups, and increases the amount of time he spends working independently. Consequently, one would predict that classes with fewer groups will have higher on-task rates than classes with more groups.
It is argued that student on-task rates are potentially manipulable: teachers not only control the allocation of time but also have the potential to influence student use of time. If teacher time is significant in terms of on-task rates, then teachers may increase or decrease on-task rates for segments of the class, by increasing or decreasing the amount of time they spend with them. Students who use time well (i.e., have high on-task rates) will likely cover more of the curriculum than students who use time poorly. If this is so, then the possibility exists for the control of coverage by the manipulation of on-task rates.

The potential to manipulate student use of time may be important in terms of managing classes of children who differ in time needs. Given the heterogeneous nature of most classrooms, it seems reasonable to expect variety in attending behavior. One would anticipate that children who attend to academic tasks consistently would finish sooner than children whose attending behavior is erratic. It was argued previously that differential finishing times are problematic; children have to be kept occupied. Consequently, children who are fast finishers may have to spend time in alternative activities until their slower classmates complete their assignments. If the extra work assigned is primarily non-academic, then the situation may arise that the high achievers are kept waiting until the low achievers catch up. In order to examine these issues the task-related behavior of each child was assessed.
Assessment of Time-on-task

The task related behavior of each child in the class was assessed every five minutes. Observations were recorded directly onto a Fortran sheet. In most of the rooms the children were assigned places so their names were listed according to the seating plan. In Class 3, where the desks were not assigned, the names of the children were listed on the coding sheet according to the class register (alphabetical order). Time periods, starting at nine a.m., with five minute intervals, were listed across the columns. The observer identified the first child on the coding sheet, watched him or her for three seconds, and recorded a numeral to indicate task related behavior. The observer then moved on to observe the next student until all the children in the class had been observed. A complete observation of all the children in the class is referred to as a sweep. Each sweep was concluded within the five minute time period. Occasionally observations were missed, because the observer was busy recording other data, such as movement of groups, and particular interactions between the teacher and students. Additionally, observation periods which coincided with transitions were not completed, and any observations already made in that observation period were not included in the data analysis.

In order to allow comparisons between classes, and within classes across time, it was necessary to utilize criteria for on-task which would cut across the idiosyncrasies permitted by individual teachers, and which would demonstrate
the least amount of reactivity. A rigorous definition of on-task, with low inference behaviors, seemed to be required. In the manner of Good and Beckerman (1978), student behavior was coded as 1=definitely on-task, 2=definitely off-task, and 3=impossible-to-determine. For the purpose of this study, on-task was used to describe students who were clearly attending to the assigned work. For example, when doing seatwork assignments, in order to be categorized as on-task the student had to be engaged in looking at the work, writing, copying from the board, or calculating. When being instructed the student had to give behavioral evidence of attending, by looking at the teacher, or at anything signified by the teacher; looking away was counted as off task. Generally, behavior was classified as off task, if the student was not actively engaged in the assigned work. Therefore, walking around the room, day-dreaming, talking, pencil sharpening, waiting at the teacher's desk, or with hand raised, collecting supplies, watching others, playing with rulers, pencils, erasers, and misbehavior were all counted as off task. The impossible-to-determine category was used when conditions were such that the behavior was indeterminate (e.g., children who appeared to be engaged in work related discussions during seatwork, and the inability to see if a particular child was scribbling or writing). Additionally, when it was impossible to see the target child, because of intervening bodies, the impossible-to-determine category was used.

During the course of the study, questions arose in the
mind of the investigator regarding the types of activities which were assigned to students. It appeared that the students who finished the work quickly, then moved on to non academic activities such as colouring or playing games. It was reasoned that possibly the high achievers finished quickly and then had to undertake "filler" activities until the remainder of the class had finished. In order to examine this idea the coding system was changed. Activities were classified as academic or non academic. The coding system was therefore expanded to five categories, 4=on-task academic, 5=off task academic, 6=on-task non academic, 7=off task non academic and 3=impossible-to-determine. The five category coding system was used from week six until the end of the study. The observational procedure continued as described previously.

It was reasoned that activities with a greater cognitive component were more likely to be related to the type of learning that traditionally schools have been expected to inculcate. Therefore activities were called academic if they involved reading, writing or printing (but not copying from the board or a book), listening to teacher explanation of the work, recitation and arithmetic. Non academic activities were listening to a story, news time, coloring, drawing, painting, playing games and copying from the board or from a book.
Reliability of the On-task Data

The use of observation as a method of data collection raises the question of the reliability of the measures generated. Medley and Mitzel (1963) distinguish three types of reliability: the coefficient of observer agreement (different observers observing at the same time), stability coefficient (the same observer observing at different times), and a reliability coefficient (different observers observing at different times). Weick (1968) has argued that a preoccupation with reliability can become dysfunctional in observational research. Similarly Rowley (1976) has argued that large scale reliability studies are unrealistic expectations for most research projects.

Rowley's argument, regarding the unfeasibility of large scale reliability studies in small scale classroom process research, was accepted. However, the establishment of some degree of reliability of the measures was considered to be necessary. Generally in classroom observation research, coefficients of observer agreement are reported. Accordingly, the reliability of the observations of on-task behavior was assessed by interrater agreement. Interrater agreement (the coefficient of precision) was secured in order to ensure that distinct phenomena were preserved in the observational records.

During the study, interrater agreement was assessed on four different occasions and in three classrooms. The investigator worked with a different rater in each class. On
the first occasion, at the beginning of week three, the second rater was a student teacher. The explanation of the system of observing and recording took 15 minutes. The training lasted for 30 minutes (6 sweeps) and over the whole day the interrater agreement was 97%. A second assessment of interrater reliability was made in the same room during the following week using the same student teacher as a rater. The observations were conducted for 30 minutes in both the morning and the afternoon and the percentage of agreement was 98% and 92% respectively. On the third occasion, week eight, the second rater was a doctoral student in school psychology. The percentage of agreement over ten sweeps was 94%. The final assessment of interrater reliability took place in week nine; the second rater was a student with a master's degree in educational psychology who was completing a professional program in teacher training. Over nine sweeps the percentage of agreement was 94%.

The calculation of interrater agreement was effected by comparing the two sets of ratings on an event-by-event basis (nominal agreement). Nominal agreement is considered by Frick and Sempel (1978) to be a more stringent way of assessing interrater agreement than marginal agreement (total frequencies in a category). They argued that when using nominal agreement:
An observer must be correct on almost every event (item) in order to achieve nearly perfect agreement. When using marginal agreement, the observer could disagree on some specific events, and yet end up with total category frequencies very similar to those of the expert's (Frick and Sempel, 1978, p. 168).

Consequently, nominal agreement provides a more stringent assessment of interrater reliability.

Task-related Behavior

General On-task Behavior

The average on-task behavior for each class over the course of the study is displayed in Table 17.

Table 17

<table>
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<th>Class</th>
<th>Mean</th>
<th>S.D.</th>
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<tr>
<td>5</td>
<td>65</td>
<td>16</td>
</tr>
</tbody>
</table>

Class on-task rates range from 81% to 63% which is comparable to the range reported by Good, Grouws and Beckerman (1978). As anticipated the highest on-task rates were obtained in classes which were teacher-dominated, and where considerable
work was done with the class as a whole (Classes 2 and 4). The lowest on-task rates were from the two classes where the teachers had described their programs as individualized, and where little time was spent working as a class (Classes 3 and 5).

A further investigation of the on-task behavior of the children, within the different instructional groups within each room (Table 18), revealed that in general the "top" groups had the highest on-task rates. On-task rates for top groups ranged from 88% to 61%; on-task rates for "bottom" groups ranged from 79% to 49%.
Table 18
Percentage On-task by Group by Visit

<table>
<thead>
<tr>
<th>Visit</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
<th>Mean</th>
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<td>1*</td>
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<td>74</td>
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</table>

Note * indicates the reading group within each class

On-task and Type of Activity

The preceding analysis investigated on-task behavior irrespective of whether the activity was academic or nonacademic. The extension of the coding system at week six permitted the task-related behavior of the groups to be
assessed in relationship to the type of activity. The results are displayed in Table 19. On-task academic in high groups ranged from 74% to 37% and in low groups from 76% to 39%. In general, it appears that when children were on-task they were likely to be attending to work of an academic nature; the only exception to this pattern was the top group in Class 4 which had higher on-task on non academic activities than for academic activities.
Table 19
Percentage Academic and Non Academic On-task Behavior

<table>
<thead>
<tr>
<th>Group</th>
<th>Academic On-task</th>
<th>Non Academic On-task</th>
<th>Academic Off-task</th>
<th>Non academic Off-task</th>
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</table>

Table 19 also indicates what students were doing when they were not on-task academic. In Classes 2, 3 and 4 students in both groups, within each class, were off-task academic and on-task non academic to a similar degree. Classes 1 and 5, where there were more groups, displayed differences in off-task academic and on-task non academic
behavior, among the groups. In Class 1, the high group was
off-task academic to a greater degree than the other groups,
and the low group on-task non academic to a greater degree
than the other groups. The pattern was reversed in Class 5.

In both total on-task behavior and academic on-task,
there were discrepancies between the high and low groups.
Table 20 displays the discrepancies between high and low
groups for total on-task and academic on-task.

**Table 20**

<table>
<thead>
<tr>
<th></th>
<th>On-task Total</th>
<th></th>
<th>On-task Academic</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Group</td>
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<tr>
<td></td>
<td>High</td>
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</tr>
<tr>
<td>Class 1</td>
<td>70</td>
<td>58</td>
<td>12</td>
</tr>
<tr>
<td>Class 2</td>
<td>88</td>
<td>79</td>
<td>9</td>
</tr>
<tr>
<td>Class 3</td>
<td>61</td>
<td>55</td>
<td>6</td>
</tr>
<tr>
<td>Class 4</td>
<td>77</td>
<td>69</td>
<td>8</td>
</tr>
<tr>
<td>Class 5</td>
<td>70</td>
<td>49</td>
<td>21</td>
</tr>
</tbody>
</table>

**Note** *indicates percentages*

Discrepancies between high and low groups for total on-task
ranged from 6% to 21%. Classes with only two groups (Classes
2, 3 and 4), showed less of a discrepancy than classes with
more than two groups (Classes 1 and 5). Discrepancies between
high and low groups for on-task academic showed less of a
range (6% to 12%). It is suggested that for academic types of
activities there was little difference in the on-task rates of
the high and the low groups.

Discussion

It is concluded that classes differed in how well students used time. The class with the highest on-task rate (Class 2) was also the class which was paced the fastest and which covered the most material. Groups within classes also differed in how well students used time; generally, high groups had higher total on-task rates than low groups. However, the subsequent analysis of on-task rates seemed to indicate that although groups differed in total on-task behavior, they were quite similar when on-task for academic activities was considered. If students differ in time needs, then similarity among the groups in on-task academic behavior is likely to maintain initial differences, rather than to level them or to sharpen them, as was argued previously.

Similarity in on-task rates for academic activities may be considered from a different perspective. Karweit and Slavin (1981) argued that because students differ in time needed to learn that engagement rates may affect student learning differentially. In particular, they demonstrated that students who were at or below the class mean showed a greater effect for engaged time than students who were above the class mean. They explained the results in terms of required learning time; students above the mean required less time, and consequently showed smaller effects. Conversely, time spent had greater effects for students below the mean,
because time spent would be expected to be more closely related to the time needed to attain the skill.

It is reasonable to argue that high group children are probably above the mean in achievement and low group children probably below the mean. Karweit and Slavin's argument leads to the proposal that a redundancy effect may operate in classrooms. If students with high and low time needs are similar in on-task rates for academic activities, one might anticipate diminishing returns for the students with low time requirements (high achievers), but greater marginal utility for students with high time requirements (low achievers). If students have fulfilled their time needs, continued on-task is redundant in the sense that it does not contribute to increased learning. If students have not fulfilled their time needs, then continued on-task is not redundant, and would be expected to increase learning. Therefore, the possibility exists that the maintenance of on-task rates by high achievers may contribute little to increased achievement, and serve merely to fill time. Redundancy of this nature amongst high achievers likely functions to prevent an increase in achievement variance. Similarly, maintenance of on-task rates by low achievers likely contributes to learning, and also may function to prevent an increase in the achievement variance of the class. Consequently, it is proposed that when on-task rates for academic activities are similar, the diminishing returns for high achievers and the increased marginal utility for low achievers, will likely functions to keep the class
Jackson (1968) suggested that waiting is endemic to classrooms because of the collective nature of schooling: students have to do something until it is time for the next activity to begin. He suggested that even though students may obey the teacher and thus appear to be busy "their busyness is analogous to that of patients who read old magazines in the doctor's waiting room" (p. 15). He further suggested that it is the students who are brighter, faster or more involved in their work who are required to wait.

The data in this study would appear to support Jackson's contention that children spend a good deal of time in "neutral". In only two of the classes did student on-task rates rise above 50% for academic activities. If it is accepted that top group children have a greater potential for learning than lower group children, then this time in neutral will affect them adversely to a greater degree than the lower group children. This analysis suggests that ultimately time in neutral for the high achievers may serve to reduce the potential variability in achievement level between students. In two of the classes the top group children spent a greater percentage of the time on-task on non academic activities than did the lower group children. This seems to suggest that in effect high achievers may be waiting for their slower companions to finish. It perhaps may be anticipated that if
the on-task rates of the lower achievers on academic activities are low then the time spent waiting or in neutral by the high achievers will be increased.

The possibility that children, particularly the high achievers, are spending a greater proportion of their time on academically trivial activities raises several questions. The implications, not only for the high achievers, but also for the class as a whole, deserve examination. Given that time is a limited resource, time spent on non academic "filler" activities is time not spent on academically productive activities. It may be reasonably concluded that the collective nature of schooling reduces opportunity to learn, and that this reduction may be more deleterious to high achievers. In other words, a ceiling effect for high achievers may exist in classes where on-task rates are low, or non academic activities are used as time fillers. The ceiling effect is likely aggravated when filler activities are used to permit low achievers to finish. Because the achievement potential of the high achievers is thus curtailed, one would anticipate decreased variability in the achievement of the class as a whole.

The Leveling Hypothesis

Bagley (1937) recognized that one of the dangers of educating large groups of people was the danger of leveling achievement. He posed the question:
Can we realize the praiseworthy democratic ideal of equal educational opportunity for all without committing the American people to a standardized-institutionalized-mediocrity? (p. 147).

A similar question has surfaced in the debate surrounding mastery learning. It has been argued that because individual differences in time needed to learn do not decrease (Arlin and Webster, 1981), mastery is purchased at the price of coverage. It was argued previously that lack of coverage of new material represents decreased opportunity to learn which ultimately may be expected to decrease achievement variance.

Leveling of student achievement may take place in two ways. The expected achievement of all students may be reduced, somewhat equally across all ability levels. Reduction of expected achievement may also occur differentially; high achievers may show less achievement gains relative to the gains made by the low achievers. It has been suggested that schools equalize achievement gains by retarding the learning of the more skilled children (Hushak, 1977). The data in the present study suggest that academic retardation of brighter students may be a function of low levels of attention to academic activities as well as the assignment of nonacademic activities to keep them busy while the slower students catch up. In chapter eight the types of activities are examined and discussed in relationship to the leveling hypothesis.
Common sense dictates that accomplished performance in any arena is achieved by devoting time to the acquisition of the essential skills. This assumption is implicit in the research on student attention and time-on-task. It is clear that in order to increase achievement students must spend time on activities directly related to the desired outcomes. Traditionally, schools have been concerned with the acquisition of cognitive skills; therefore one would anticipate that time in schools is spent on academically productive activities. The questionable nature of this assumption was demonstrated in chapter seven: some students appear to spend a considerable amount of time on non academic activities. The purpose of the present chapter is to examine the nature of some of the activities undertaken in school.

Learning or Cooperation

Traditionally, the business of school has been to inculcate in students the knowledge and skills usually displayed by competent adults in a complex society. This has been referred to previously as the manifest function of schooling. Learning as the primary outcome of schooling was rarely questioned. Yet recently this traditional view of the function of the schools has been challenged. Jackson (1968)
proposed that although learning may be the ultimate goal of schooling the group nature of teaching requires that the teacher focus on activities as a basis for day-to-day planning:

Teachers, particularly in the lower grades, seem to be more activity-oriented than learning-oriented. That is, they commonly decide on a set of activities which they believe will have a desirable outcome and then focus their energies on achieving and maintaining student involvement in those activities. Learning is important, to be sure, but when the teacher is actually interacting with his students it is at the periphery of his attention, rather than at the focus of his vision (Jackson 1968, p. 162).

The notion of activities as central to pedagogical decisions has received empirical support. Zahorik (1975) investigated how closely actual planning behavior of 194 teachers, who taught kindergarten to adult levels, approximated the rational means-end model developed by Tyler (1950). In contrast to the Tylerian model, which gives preeminence to the formation of goals or objectives as a guide to action, Zahorik found that activities rather than objectives were important planning decisions in terms of quantity of use. Although the first decision made was a decision about content, activities were considered by more teachers. Similarly, in a study by Peterson, Marx and Clark (1978), involving the planning statements of social studies teachers, the smallest proportion of planning statements was devoted to objectives. In agreement with Zahorik's findings, the teachers in the Peterson et al. study made the largest proportion of planning statements regarding the content to be
taught.

Support for activities as a dominant theme in the thinking of teachers has been documented by Yinger (1980). In a study of the planning decisions of one elementary teacher he determined that activities "were the teacher's most important and most frequent planning concern" (p. 123). Yinger interpreted this result as supporting the conclusions reached by Zahorik (1975) and Peterson, Marx and Clark (1978), as in his study, decisions about activities also involved decisions about content or subject matter. In the face of this evidence, it seems reasonable to conclude that teachers may perhaps be more concerned with the selection of appropriate activities than they are with the selection of appropriate learning outcomes.

Acceptance that activities rather than learning outcomes or objectives are of paramount importance to teachers, need not lead necessarily to the rejection of the idea that the function of the school is to promote learning; teachers are free, after all, to choose and implement activities which are intended to lead to increased student achievement. This seems a reasonable interpretation of Jackson's distinction between primary and ultimate goals; in the short term teachers may concentrate on selecting activities which induce greater student involvement but with the long range goal of increasing achievement.

Jackson's view is that of a moderate. A radical view of the task of the teacher has been proposed by Doyle (1979).
Doyle denied that learning is the goal of teaching. He based his argument on the notion that teachers encounter classrooms as units of time and, presumably because "nature abhors a vacuum", the time must be filled with activities. He argued further that survival in the classroom depends upon the teacher's skill at securing and maintaining student cooperation in the activities. The basic task of teaching—securing student involvement—is fundamentally problematic for teachers, because students differ widely in their aptitude and propensity for the activities. Additionally, student cooperation in activities is further influenced by the character of the activities. Successful teaching, in Doyle's view, involves maximizing the likelihood of student participation by careful selection of activities.

Doyle conceptualizes the task of the teacher as one of securing and maintaining student cooperation in activities. To the extent that Doyle intends us to believe that learning has been replaced by cooperation as the goal of teaching, he may be charged with having confused means with ends. Presumably student cooperation in activities is a means to achieve the goal of learning. A more moderate approach might be to consider that student cooperation in activities is a necessary but not sufficient condition for learning to occur; the nature of the activity might reasonably be expected to set limitations on what the student may learn. The adoption of this latter position directs attention to the types of activities which are implemented in classrooms.
Doyle's basis thesis that teachers are concerned with maintaining student cooperation leads to some reasonable inferences regarding what kinds of activities might be implemented by teachers. One would anticipate that activities would be selected based upon student interest demonstrated through on-task behavior. Given the range of ability in most classes, one would anticipate that activities appealing to a wider spectrum of ability would sustain on-task behavior for a longer period of time than activities designed to challenge a small proportion of students. Further, it seems reasonable to expect that activities which appeal to a wider range of ability will not require higher level cognitive skills. The use of activities with broadly based appeal might be expected to lead to a fair amount of time wasting by the brighter students, because of redundancy, or finishing quickly and then moving on to work of a non-academic nature.

Characterizations of Classroom Activities

The argument that student cooperation in activities is a necessary but not sufficient condition for learning raises the question of how best to describe what takes place in classrooms. The purpose of this section is to review the ways in which the business of the classroom has been described and classified. The term "activities" appears to be a generic label to indicate that students do things in classrooms. Other ways of analyzing classroom behavior in manageable units have been suggested; behavior settings, segments and tasks are
labels which are currently used. All of these labels appear to involve or include the notion of activities.

A behavior setting consists of standing patterns of behavior which are not restricted to the particular individuals involved (Barker, 1968): reading circles, drill lessons and music lessons are examples of behavior settings as are baseball diamonds and church services. Behavior settings are important because of the growing evidence that substantial proportions of the variance in behavior are accounted for by situational and environmental variables (Moos, 1973). Good and Beckerman (1978) investigated pupil involvement in sixth-grade classes. They found that the setting appeared to have an important influence on pupil involvement. Pupil involvement appeared to be highest in small or large teacher led groups; involvement was lower during whole-class and individual activities.

Gump (1967) investigated the relationship between the behavior of the participants and the behavior setting subunits or segments. (Segment was the name given to divisions within a lesson such as reading circle, story time etc). In particular he looked at the involvement of students in externally-paced small group segments (such as reading circle), in externally-paced total group segments (such as class recitations), and self-paced segments (individual work). External pacing refers to the amount of prodding provided by the environment which, in effect, was the amount of teacher involvement and guidance, such a reminders. Involvement was
highest when the pacing was external. Gump interpreted student involvement as a function of the presence or absence of external stimulation. In chapter seven it was shown that the two classes (2 and 4) which had the greatest amount of whole class instruction (which involves external pacing by the teacher) had the highest on-task rates.

Additional research has attempted to identify the characteristics that account for differences in student involvement. Kounin and Gump (1974) investigated the impact of lesson type on the on-task behavior of preschool children. Lesson types were identified according to the external provisions which were capable of maintaining behavior. These were labelled signal systems. A continuous signal system occurs as one action and its immediate result provide impetus and guidance for the next action. The results indicated that the more continuous and unlagging the signal system, the higher the on-task involvement. These results seem to suggest that within lesson behavior settings having the highest degree of continuity of signal systems will promote greater on-task behavior and result in fewer delays.

Behavior settings and segments are labels useful for describing the combined activities of teachers and students. Doyle (1979) proposes an additional way of describing classroom behavior; he makes a distinction between activities and tasks. He treats the concept of activities as synonymous with the concept of behavior settings and segments:
The concept of "activities", derived from the literature on ecological psychology, designates bounded segments of classroom time, for example, seatwork, tests, small-group discussion, lecture, recitation, reading (Doyle, 1979, p. 45).

In contrast, Doyle describes the concept of task as being derived from the literature on human cognition; it refers to the way in which information in the environment is processed. He defines a task in terms of a goal and a set of operations to achieve that goal. To describe an activity in terms of its task structure is to comment on the cognitive demands of the task. Doyle also makes the point that the same task can be embedded in different activities. Conversely, the same activity can have different task structures.

Doyle has argued that tasks consist of goals and operations to achieve goals. The type of operation required for goal attainment may influence pupil involvement. It seems likely that tasks involving lower level information processing demands, such as verbatim recall, will secure higher on-task rates than tasks demanding more complex processing. It is assumed that generally academic activities require higher level processing and therefore represent higher task demands. Conversely, it is assumed that generally non academic activities represent lower level processing and therefore are indicative of lower task demands.

Bossert's conceptualization of task has no connotation of the degree of difficulty and appears synonymous with activity. Bossert (1977) investigated the relationship between classroom task organization and teacher control
behavior. Two of his task categories, classtasks and multitasks, are of interest in the present discussion. Classtask refers to any activity that is assigned to the whole class, such as worksheets, tests and workbook pages. In contrast multitask settings are characterized by many different tasks being worked on simultaneously. Bossert's third category describing classroom structure, recitation, refers to time spent by the whole class and by groups in instruction.

The researcher who wishes to describe what takes place in classrooms is presented with a choice of labels: behavior settings, segments, activities and tasks. In this study, activity is used in the generic sense to describe the major occupation of students and teachers in a particular time period. Accordingly, activity is used to describe passive behaviors such as listening to the teacher during instruction or story time, as well as active behaviors such as cutting and pasting. Activity as a label encompasses the behavior of both teacher and students; for example, in a recitation lesson both the teacher and the students are engaged to some degree in a combined enterprise. Activities as shared enterprises are to be contrasted with assignments which are engaged in only by students.

Doyle (1979) argued that the norm of rationality of schooling is that all students must have something to do. Usually non instructional time periods are handled by the teacher assigning the students things to do. In this study
any work, exercise, project or job that was assigned to students, to be done independently of the teacher, is referred to as an assignment. Typical assignments included exercises in workbooks, drawing pictures, and petting the gerbil. Assignments may be done individually or collectively, as when a small group works on a picture, model or game. One assignment may be given to the whole class (classtask) or several assignments may be engaged in simultaneously (multitasks). Assignments are particularly important in view of the amount of time that children are expected to work independently.

Implementation of Activities

Many educational jurisdictions require that teachers keep a record of the activities undertaken by the class. Generally, teachers fulfill this obligation by recording the activities undertaken in specified time periods during the day. A glance at a daily plan book might leave the uninitiated with the impression that activities are implemented in a sequential and orderly fashion; often the sequence and order is only apparent at the end of the day. To enter a classroom at 9:30 when the daily plan ordains "9:00 - 10:00 a.m. reading page 23" is often to find children engaged in a variety of activities. Some children may indeed be reading, either with the teacher or by themselves: some may be doing exercises in workbooks or on worksheets; yet others may be coloring or playing a game. Rather than sessions with
clearly demarcated beginnings and ends, elementary classes may perhaps be better characterized as being dominated by various activities at different times during the day. The various dominant activities are usually associated with the subject that appears on the timetable. While a micro analysis may reveal several simultaneous activities which fade almost imperceptibly into each other, reflection at a more macro level, at the end of the day, will likely reveal that the major activities recorded in the plan book have been implemented.

Classroom activities are dynamic rather than static: as children finish one activity or assignment they move on to the next one. An attempt was made to capture the dynamic nature of activities. Every fifteen minutes during one of the visits a count was made of the number of different activities in the classroom. The results are displayed in Table 21.
Table 21

Time Periods with Number of Activities in Progress

<table>
<thead>
<tr>
<th>Class</th>
<th>Activities</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1</td>
</tr>
<tr>
<td>1</td>
<td>5*</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>1</td>
</tr>
</tbody>
</table>

Note * indicates the number of 15 minutes time periods.

Two distinct patterns emerged; classes were either dominated by one activity, or by several entirely different tasks which were worked on simultaneously. Where a single activity dominated a class, it was either recitation or a classtask. A common multitask pattern involved the teacher instructing a group of children while the remainder did individual seatwork assignments. Multitasks also describes the situation where children are working on a variety of activities without the teacher necessarily engaging in an instructional role.

Classification of Activities

Classroom activities have two dimensions which may reasonably serve as a means of classifying them. One dimension is the amount of active teacher involvement in an
instructional as opposed to a managerial role. The other is the organizational structure of the activity; organizational structure refers to whether the activity is engaged in by all children simultaneously or at different times.

The classroom activity most dominated by the teacher in an instructional role has been referred to as the recitation. Thayer (1928) attributes the introduction of the recitation to Joseph Lancaster whose monitorial method of teaching groups replaced the then traditional individual instruction at the teacher's desk. He argued that the hallmarks of the recitation were the dependence upon textbook memorization and the attempt to "have ten little voices chirrup where one voice chirruped before" (Thayer, 1928, p. 5).

A more recent review of the recitation (Hoetker and Alhbrand, 1969) compared the recitation to the classroom language game (Bellack, Kliebard, Hyman, and Smith, 1966) in which basic verbal exchange in the classroom takes place according to the solicitation-response model. Bossert (1977) also emphasised verbal interaction between teacher and students as a characteristic of the recitation. Recitation:

involves the whole class or a large group of children in a single task: the children listen to the question the teacher asks, raise their hands, wait to be recognized, and give an answer. Children can ask questions when they do not understand the material, though the teacher usually controls the flow of questions and answers (Bossert, 1977, p. 554).

Verbal intercourse in a highly conventional manner appears to be a characteristic of both earlier and later
recitations. However, it seems apparent that the recitation has undergone some adaptations since it was first introduced. Earlier recitations appeared to have depended heavily upon children regurgitating material which they had memorized at home; the teacher in effect conducted an oral examination of homework. Latter day recitations seem to concentrate more directly on instruction rather than on testing the acquisition of previously learned material. In both cases, the recitation may be seen as a vehicle for drill and practise work. An adaptation of the recitation noted in this study, involved the teacher assigning a common task to the class at the completion of the recitation. This will be referred to as a classtask.

Recitation was not the only instructional pattern observed. A common activity pattern was the teaching of a group, usually during reading, while the remainder of the class was engaged in private seatwork. As the students were assigned work based on group membership, this activity pattern is called groupwork. On some occasions, the teacher assigned the same task or different tasks to the class, and then proceeded to work with a group. This gave rise to two further ways of classifying activities, classtask+group and multitask+group. The final activity in this system of classification is the multitask pattern. Unlike the other five activity types this involves the teacher solely in a supervisory or managerial function. Children are engaged in several different assignments simultaneously and the teacher supervises. In this activity type, teacher control over the
amount and quality of the work is reduced.

The types of activities used in each class was determined by an examination of the narrative specimen records of the observations. The observational records for each fifteen minute time period were analyzed and the classroom activity assigned to one of the six categories. The results are recorded in Table 22.

Table 22
Percentage of Time on Activities

<table>
<thead>
<tr>
<th>Activity</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Recitation</td>
<td>32</td>
<td>37</td>
<td>11</td>
<td>36</td>
<td>18</td>
<td>26</td>
</tr>
<tr>
<td>Class task</td>
<td>24</td>
<td>15</td>
<td>1</td>
<td>39</td>
<td>15</td>
<td>18</td>
</tr>
<tr>
<td>Groupwork</td>
<td>37</td>
<td>48</td>
<td>0</td>
<td>20</td>
<td>9</td>
<td>22</td>
</tr>
<tr>
<td>Multitask</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>2</td>
<td>48</td>
<td>25</td>
</tr>
<tr>
<td>Class task + group</td>
<td>6</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>11</td>
<td>4</td>
</tr>
<tr>
<td>Multitask + group</td>
<td>0</td>
<td>0</td>
<td>38</td>
<td>0</td>
<td>0</td>
<td>7</td>
</tr>
</tbody>
</table>

As might be expected, the classes described as individualized spent the least amount of time in recitation and groupwork, and the most amount of time in multitask activities. However, although there was variation in activity structure, all classes spent time working as a whole and working in groups. Table 23 displays the percentage of time on spent on activities in whole class, groupwork, and multitask formats. Whole class format includes percentage of time on recitation and classtasks; groupwork format includes...
the percentage of time on groupwork, classtask+groupwork and multitask+groupwork. Multitask format represents the percentage of time when students were engaged in several activities simultaneously, and the teacher adopted a managerial as opposed to an instructional role.

Table 23
Percentage of Time Spent in Different Formats

<table>
<thead>
<tr>
<th>Class</th>
<th>Whole Class</th>
<th>Group</th>
<th>Multitask</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>56</td>
<td>43</td>
<td>0</td>
</tr>
<tr>
<td>2</td>
<td>52</td>
<td>48</td>
<td>0</td>
</tr>
<tr>
<td>3</td>
<td>12</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>4</td>
<td>75</td>
<td>23</td>
<td>2</td>
</tr>
<tr>
<td>5</td>
<td>32</td>
<td>20</td>
<td>48</td>
</tr>
</tbody>
</table>

Whole class teaching and groupwork dominated the organizational pattern of Classes 1, 2 and 4. Although a high percentage of time was spent on multitask activities in the two individualized classes, whole class work and groupwork were also features of these rooms.

Activities as Functional Environmental Responses

Ecological environmental psychologists (Barker, 1968; Moos, 1973) suggested that behavior which persists does so because it is a functional response to the environment. Hoetker and Alhbrand (1969) have suggested that the persistence of the recitation over a considerable number of years indicates that it is a functional response to the demands of the classroom. More specifically, they raised the
quest ion: What is there about the recitation, for instance, that makes it so singularly successful in the evolutionary struggle with other, more highly recommended, methods? That is what survival needs of teachers are met uniquely by the recitation? (Hoetker and Alhbrand, 1969, p. 163).

In the present study groupwork and the multitask pattern were also well represented. This prompts the question as to whether these activity formats have survival value for teachers.

It is suggested that assigning the class one activity as in the recitation and the classtask, and adopting the groupwork format or the multitask activity, may all be functional responses to the classroom environment. In this study, the task of the teacher was conceptualized as moving a group of students who differ in time needed to learn through a set amount of curricular material in a limited amount of time. In effect, the teacher has to seek a balance between meeting individual needs and covering the material. The three major types of activities provide the means whereby the teacher may accomplish this task. The recitation and classtask likely permit the teacher to introduce, review and drill curricular material with the whole class; groupwork provides for the differentiation of difficulty level of the work and, like the multitask activity, seems better suited to meeting individual needs.

It seems tenable to argue that recitation and classtask activities permit the teacher to concentrate on mastery, or
depth of learning, possibly at the expense of accommodating to individual needs. Recitation and classtask activities seem to be economical and efficient ways of introducing, reviewing and drilling the material with large numbers of children. The disadvantage is that the uniform speed of coverage which is involved is unlikely to accommodate all students; teachers may purchase mastery at the expense of boredom for some children and frustration for others.

In contrast, groupwork and multitask activities seem to serve a different purpose. The differentiation of difficulty level in groupwork and the existence of several tasks to be worked on simultaneously in multitask activities probably serve to accommodate fast and slow workers to a better degree than the uniform rate of progress usual in the recitation. However, accommodation to individual time needs likely carries with it the danger of discrepancies within the class in terms of coverage; the better students may surge ahead but the poorer students may fall behind. It was argued in chapter five that a slow rate of presentation of new material functioned to prevent increased variance in coverage. The increase in achievement variance, a concomitant of increased variance in coverage, may not be a price that teachers are willing to pay.

A recurring theme in the current discourse is that teacher decisions regarding time may be seen as attempts to resolve the conflicting demands of meeting individual needs and also covering the required amount of work with the class.
Some teachers may emphasize the needs of the class and therefore adopt recitation and classtask activities (Classes 1, 2 and 4). Others may emphasize the needs of the individual and hence utilize multitask activities to a greater degree (Classes 3 and 5). However, all teachers spent some time with groups. Groupwork reflects differentiation among students in terms of performance rates which seems to indicate some concession to individual differences. Groupwork also permits the class as a whole to cover a greater portion of the curriculum because the groups are provided with material at an appropriate level of difficulty.

Rewards and Costs of Activities

It is perhaps instructive to consider classroom activities in terms of the rewards and the costs, to both students and teachers. Rewards may be intrinsic to the activity, instrumental in achieving an important goal or merely conformity to normative expectations. In other words, teachers and students may both enjoy an activity, for example story time, because of its intrinsic satisfaction. On the other hand, the motivation to teach and to learn multiplication tables may be more instrumental than intrinsic. Learning multiplication tables may be rewarding to students because they realize that they need to know them in order to pass to the next grade, whereas for teachers the reward may lie in avoiding the wrath of the teacher of the next grade, or in securing her favorable attention. Alternately, conformity
to normative expectations may motivate students and teachers as both realize that at certain grade levels particular skills are taught and the associated competencies are acquired.

It seems incontestible that activities provide some form of reinforcement to those who engage in them. It is equally as likely that activities have cost attached to them. From the teacher's perspective, classroom activities require time and energy to prepare and to implement. It seems unquestionable that some activities are faster to plan and prepare for and are simpler to organize and implement in the classroom than are other activities. Activities therefore may be described in terms of cost factors (time and energy) to teachers. Similarly activities may be described in terms of cost factors to students. Activities which rely on well-established skills are likely easier than others which require the acquisition of new skills. It is suggested, ceteris paribus, that both students and teachers will prefer activities which are low in costs, and at the same time high in rewards.

It is proposed that activity types which recur do so because they have been successful in the past. Successful activities would seem to be those which have high rewards and low costs. Students, reasonably, will prefer activities which are easy (low cost), and for which rewards are high. It seems equally as feasible that teachers will prefer activities which require the minimum of preparation time and are easy to implement (low cost), and for which the rewards are high. The
best possible situation is likely a congruence between teacher and student rewards and costs. Therefore, it may reasonably be anticipated that activities which are repeated are high in rewards and low in costs for both students and teachers.

To recapitulate, the main argument is that activities have rewards and cost attached to them. It was further argued that activity types which dominate classrooms do so because they represent a balance between student and teacher rewards and costs. This analysis provides a possible explanation for the popularity of some activity types and the relative absence of others.

One of the most popular lesson types, the recitation, would appear to be high in costs to the teacher. Typically recitation lessons involve preparation prior to the lesson and a considerable degree of energy during the lesson. One would therefore anticipate that if the recitation activity is used often either the teacher had found ways to reduce the cost or that the rewards are particularly high.

A major source of reward for teachers in the recitation activity is that it affords a considerable degree of classroom control and permits the teacher to combine both the instructional and managerial roles (Bossert, 1977). The physical structuring of the class during this activity permits close surveillance of all children. During recitation, teachers either had students remain in their desks, or called them to a particular location in the room (typically a carpeted area where the children sat on the floor). In either
case, the teacher assumed a central and commanding position which permitted her to spot misbehavior and also allowed her to monitor student participation. Students in classes with a higher percentage of recitation and classtask activities (1, 2 and 4) were also the classes with the highest on-task rates. Presumably student attention is reinforcing to teachers which suggests one explanation of the popularity of the recitation.

It was suggested that potentially the recitation has high cost factors for teachers, and that in order for teachers to adopt this activity type as a regular occurrence, they likely find ways of reducing the costs. In the three classrooms where this activity type was preferred, cost reducing techniques were in evidence. Three major ways of reducing costs were identified; simplification, prompting and routinization. Each technique was idiosyncratic to one of the three teachers who used recitation extensively. The least complex form of cost reduction, simplification, used in Class 4, involved giving a brief explanation or review of some work, and then assigning a classtask. Cost reduction was effected by reducing the time of the recitation and the level of difficulty of the topic. The recitation was marked by an absence of any development of the topic under discussion, which led to relatively simple assignments being set.

Simplification serves to reduce teacher energy costs during the lesson, because the recitation is both short and the content easy. Simplification served to reduce within lesson costs, whereas prompting reduced preparation time costs
prior to the lesson. Prompting, used in Class 1, refers to the common teacher behavior of teaching directly from a guide book or a text book. Teachers who use a guide book or a text book, for the development of a topic during the recitation, effectively reduce the time they must spend preparing their lesson.

The third cost reduction technique, routinization, is probably the most complex, in that it demands a high level of teacher control; routinization was employed by Teacher 2. This teacher reduced both the preparation and the energy costs by increasing student participation in the recitation. She did this by utilizing set patterns of behavior which had been learned previously by the class. One such technique involved all children responding to questions in their notebook instead of one child replying orally. Another way of maintaining student involvement was by using several well-established game routines. The high level of student involvement, brought about by routinization of activities, likely functioned to reduce teacher pre-lesson and within lesson costs.

When recitation was used extensively by teachers, they appeared to have found effective means of reducing the initial preparation costs and the within lesson energy costs. We may reasonably construe that for these teachers the rewards, student involvement and mastery of curricular material, were commensurate with the cost factors. Recitation type lessons probably also offer increased rewards with reduced costs for students. At the lowest level, the recitation represents a
reward because it offers a change of pace from other activities. To the extent that it reduces student fatigue, or boredom with other activities, the recitation is likely to be successful. Because of teacher involvement, through explanation or demonstration, the recitation is likely to be easier for most students, and therefore represents reduced costs. To the extent that the teacher structures the recitation to accommodate lower achieving students this may represent reduced cognitive costs for most of the class.

Recitation probably affords the greatest amount of control of both social and academic behavior and multitask activities the least amount of control of both behavior and speed of work. It will be recalled that the two classes where this activity type dominated (Classes 3 and 5) had the lowest on-task rates. The question naturally arises as to why this should be an activity type which is sustained. One possible explanation is that the multitask activity permits the teacher a greater degree of freedom and flexibility than the other types of activities. During multitask activities students, for the most part, are expected to work independently of the teacher. The teacher is thus freed from instructional duties and can turn her attention to other matters. During multitask activities teachers were often to be observed marking work, helping individual children, preparing student work for display and a multitude of other non-instructional activities which nevertheless are necessary to maintain the functioning of a classroom. It seems likely that teachers are prepared to
sacrifice some control of student behavior and work so that they may accomplish their other duties.

Potentially multitask activities are high in costs to the teacher in terms of designing and implementing several learning tasks simultaneously. Yet the popularity of this activity type indicates that cost reducing factors may be operating in classrooms where multitasks are regularly employed. One of the outstanding characteristics of multitask activity periods is that the teachers did not initiate several activities during those sessions. Usually children finished off assignments begun in another class period. Consequently the tasks were already understood and did not require further teacher explanation. Another cost reducing characteristic of multitask activity periods was the prevalence of commercially produced materials. During this type of activity period, children were observed to use commercially produced games, workcards and worksheets. Consequently, the cost to the teacher, in terms of time to prepare several types of materials, was reduced.

The multitask activity period presented several advantages to children. Typically, the classroom atmosphere was relaxed during multitask periods and children had greater freedom. Rules regarding talking and moving about the room, which were usually enforced during recitation, were considerably relaxed. During multitask activity periods, children were observed to engage in more socially oriented behavior than they did during recitation. Additionally,
children were freed somewhat from the constraints of teacher pacing. Generally, they could work as quickly or as slowly as they liked, although teachers did issue cautionary notices that certain work should be completed by a certain time.

Possibly the most demanding activity type is groupwork. This was used predominantly by only three teachers (1, 2 and 4), and occurred usually during Language Arts lessons, when teachers instructed a reading group and provided the other groups with seatwork, which was to be done independently. This activity type is likely high in teacher costs, both in terms of preparation time, and management during the lesson. As was argued in chapter three, grouping permits teachers to select different curricular materials for different children. Pragmatically, the matching of materials to student ability likely serves to reduce both boredom for the faster students and frustration for the slower students. Differential mastery levels also permit greater coverage of the curriculum, at least for some students. Greater coverage and higher student involvement likely compensate for the increased time costs of preparation involved in groupwork activities. An additional feature of this lesson type was the use of workbooks for independent seatwork, which probably functioned to reduce preparation costs substantially.

The groupwork activity type has the potential to increase the difficulty of classroom management. Teachers must instruct a group of children, which demands a fair degree of attention, and at the same time they must be attentive to
problems arising from the remainder of the students who are engaged in private seatwork. To use Doyle's term (1979), the information processing demands of this type of activity are probably considerable. One would anticipate that teachers who used this type of activity would seek to reduce the information processing demands. Teachers who used this activity type attempted to reduce interruptions to their teaching by explaining the work to all groups before they began instructing. They also adopted the rule, not always consistently adhered to, that they were not to be interrupted during their teaching. Typically, teachers took a few minutes between groups to walk around the room, monitoring private seatwork and responding to student questions.

This analysis in terms of rewards and costs also offers an explanation of the lack of success of the classtask+group activity. The dearth of the classtask+group activity is understood if one accepts the manifest function of grouping—to provide a greater degree of individualized instruction. In this sense, it would be contradictory for teachers to teach the class in groups, but to provide the same kind of seatwork for all the children. When this activity type occurred, teachers set a common task and then took a group of children to introduce or review some other work. The content of the group teaching and the assignment were not related. It seems probable that this activity type functions to provide time for the teacher to work with a group without being distracted by children requiring directions or help with the assigned work.
The fact that this activity type occurred on what was described by one teacher as a "catch up" day tends to support this view.

The previous discussion concentrated on the types of activities which appear regularly in classrooms. Activity has been used to describe how the teacher organizes the class for a lesson, whether she engages in instruction of the whole class or of a group, or assigns one task or several. All activities, except the recitation, involve the setting of assignments. It is perhaps opportune at this juncture to turn attention to the types of assignments that teachers give to students.

**Blotting Paper Activities**

Jackson (1968) has commented that classrooms are busy places: rarely are children legitimately allowed to do nothing. Most teachers seem to take some precautions to ensure that all students are occupied. It seems unreasonable to expect that young children can be occupied solely with assignments which are academic and neither should we assume that non academic assignments are necessarily time wasters. It seems reasonable to accept the argument that non academic assignments may function to provide variety, to relieve the fatigue and tension associated with work, or to provide reinforcement for the completion of an academic task. While we may be prepared to accept that non academic assignments are necessary evils we might be tempted to question the balance between the two types of assignments, both for the class as a
whole, or for individual children.

One way to avoid the problem of children with nothing to do is to ensure that the assignment cannot be completed during the allotted time. Some classroom activities are constructed such that they consume a great deal of time. Riesman (1958) has named such activities "blotting paper" activities because they appear to soak up time. The suggestion is that such activities consume more time than is warranted by their educational value. In the present study, two kinds of blotting paper activities were identified, the mirage and the Premack assignments. Mirage assignments have face validity, but perhaps are not as educationally productive as they might be. Premack assignments have a requirement that the academic work is to be completed before the child progresses to the non-academic component. An obvious advantage of blotting paper activities is that the necessity of preparing extra work is precluded. An equally obvious disadvantage is that time spent on activities of dubious educational worth reduces the time available for academically productive work.

The Mirage Assignment

Doyle (1979) has commented that not only must children be engaged in activities but that the activities must be educationally justifiable. Mirage assignments have face validity, but closer inspection reveals that they are not as educationally sound as they first appeared. Mirage assignments are superficially academic in nature, in that they
involve reading and writing; but they appear to require the practise of skills already acquired, rather than to involve the acquisition of new skills.

An example of a mirage assignment was the fable task assigned in one of the classes. This Language Arts activity was based upon a film in which a fable was mimed. At the conclusion of the film, the children were instructed to fold and cut some plain paper so that there were four flaps which could be raised. They were told to print their name, the date and "a fable" on the first flap. On each of the other flaps they were told to write something from the beginning, the middle and the end of the fable. Under each flap, they were to illustrate the part they had written about. At the end of the film, a commentator had summarized the moral, and the teacher subsequently reviewed what had happened in the film, so that the assignment was little more than a recall task with some drawing and coloring. This assignment constituted the morning work and the students were given until recess to complete it.

This task is classified as a mirage assignment, because, at first blush, it appears to be academic in nature. Part of the grade three reading program concentrates on learning that stories have beginnings, middles and ends. However, little attention was paid to the printing of appropriate sentences, and greater time was required to draw and color the pictures. In terms of the amount of time required, the academic component of mirage assignments can be
completed in far less time than the non academic component. Therefore, in this instance, it is argued that the printing merely provided face validity for an assignment that was primarily non academic in focus.

This assignment is also interesting because it functioned to serve children of varying levels of ability. The amount to be written was not specified so some children filled the flap while others printed one short sentence before making a picture. In Doyle's framework (1979), the task was potentially high in ambiguity, because requirements were not specified, and low in risk, because anything seemed to be acceptable. Consequently, this assignment kept some students occupied for a short time, and others occupied for a much longer period of time. Also, the nature of the assignment permitted the students to become engaged in other things; for example, to go to the reading group with the teacher, to do corrections, and at the same time always to have "work" on their desks to which they could return. Using an analogy from music, this task was the central theme which dominated the early part of the morning; subthemes, such as workbooks and writing emerged once in a while, but were always replaced by the main theme.

In a second type of mirage assignment the academic and the non academic parts, like an alloy, are not easily separated; the form and the content of the activity are intertwined. The content is appropriate, that is academically suitable for the grade level, but the academic nature is
debased by the form in which students are required to present their work. One example was the assignment which involved coloring parts of a picture of an owl. The color to be used for each part was determined by solving an addition problem printed inside the part. Once the problem had been solved, the students referred to a key and used the answer to select the color for that part. The students were not told to complete all the problems first and then color the picture, so they proceeded to calculate each problem and then color the appropriate part. In this assignment, as in the fable task, the academic part consumed far less time than the non-academic part.

A further demonstration of how the form (cutting and pasting) detracted from the academic content (dividing words into syllables) is provided by the syllable assignment to be described next. The teacher explained that the children were to fold a piece of construction paper (12x18 inches) into four segments and to label each segment one, two, three, or more than three syllables. They were then to cut words from magazines and to paste them on the paper according to the number of syllables. The task has face validity because syllabification is a legitimate part of the grade three reading program. This assignment appeared to function largely as a time filler as it occupied more than one hour and fifteen minutes; the small size of the print and the large size of the construction paper ensured that a lot of cutting and pasting was required; (interestingly this assignment was given on the
day of the week described by the teacher as "catch up" day). This assignment displayed another feature common to mirage assignments in that it permitted responses on a variety of levels; the students could pick the words which they knew how to read, and they could do as many, or as few, as they wished.

**Premack Assignments**

In assignments which have been labelled mirage the academic nature of the activity is called into question. Assignments described as Premack, or alternately "carrot" assignments, raise no such questions as they have a component which is obviously academic, and a component which is non academic. The non academic part, usually coloring or drawing, is apparently intended to act as an incentive to complete the work; it also appears to serve the purpose of keeping fast workers occupied. Premack assignments are so named as the less preferred part, the work, is always required before the more preferred part, the drawing or the coloring. Examples of Premack assignments include writing a story and then illustrating it, or writing a poem and then adding a decorative border.

Premack assignments seem to occur frequently in classrooms and are often suggested in teacher guide books and idea books. The rule, work then color, seems to offer the teacher considerable control over the speed at which work is completed. Mirage assignments suffer from the defect that unless the assignment is completely finished the academic work is not covered; Premack assignments have no such defect. It
is possible for the assignment as a whole to remain incomplete but for the "real" work to be finished. The singular advantage, from the teacher's point of view, is that she can assign one task to all students, and can be reasonably sure that the faster workers will be kept occupied with coloring while the slower ones finish the academic part. Premack assignments lend themselves to being collected in "finished or not"; usually it is the non academic part which is incomplete.

Mirage and Premack assignments have a non academic component, therefore it was argued that to some extent they function as time fillers. In addition, it seems reasonable to maintain that the non academic component, usually coloring or drawing, functions to reduce the cognitive demands of the task. Consequently, these assignments are likely to have a more broadly based intellectual appeal than strictly academic tasks which involve increased cognitive demands. Similar comments on classroom activities have been made by other researchers (Galton, Simon and Croll, 1980). While they document that the "typical" pupil is involved for 75 percent of the time, the English researchers described activities which were "'safe', intellectually undemanding tasks" (Galton, Simon and Croll, 1980, p. 183). They also commented that the observers, who were experienced teachers, "saw little of educative value in these activities" (p. 183).

The existence of both mirage and Premack assignments in classrooms might be construed as support for Jackson's (1968) contention that the primary aim of the teacher is to secure
student involvement in activities: the mirage assignment in particular seems to lend credence to Doyle's (1979) radical view that it is cooperation rather than learning which is of paramount importance to the teacher. A more moderate position is defensible. DeVoss (1979) has questioned the assumption that all time in classrooms should be academically productive. He observed that students sharpen pencils, doodle, and talk to each other. He argued that although these are not educationally productive they are, nonetheless, human activities that cannot be eliminated. Similarly, it seems reasonable to suggest that differential finishing rates are also characteristics of human groups and difficult, if not impossible, to eradicate. Classrooms activities, such as the recitation and multitask activities, and assignments, such as the mirage and Premack, are perhaps teacher responses to the fundamental classroom dilemma of children who work quickly and those who work slowly.
Chapter 9

Concluding Discussion: Equilibrium as a Model for Classroom Processes

In chapter one, the reader was invited to accompany the author on an exploration of some time related aspects of life in classrooms. A journey without a map was proposed, to enhance the possibility of serendipitous findings. At the end of such a journey, it is appropriate to look back over the road that has been travelled, with something of a cartographer's eye. To this end, the purpose of this chapter is to survey the terrain and to identify the salient features. But, travel often does more than expand geographical horizons. Typically, at the end of journeys, travellers are left with various forms of intellectual baggage; a kaleidoscope of what were once distinct sights and sounds often coalesce into general impressions. A second purpose of this chapter is to articulate these general impressions, and to reflect on the conceptualization of teaching and the model of classroom processes which they suggest.

Limitations of the Study

Prior to the concluding discussion, it is appropriate to identify the major limitations of the present study. It will be recalled that the sample consisted of five grade three classrooms which were not randomly selected. Therefore, generalizations to other grade three classrooms, and to other
grade levels, must be made with caution. In addition, the adoption of a naturalistic methodology, which involved observation by one person, raises the spectre of bias. Although the problem of bias was discussed in chapter two, and appropriate techniques to reduce bias were suggested, the possibility of a biased interpretation must remain. Finally, many of the reflections on the effects of the coping strategies have been speculative in nature. For example, the lack of achievement data did not permit an empirical examination of the relationship between coping strategies and student output. However, it is claimed that comments of a speculative nature, based on plausible inferences, are legitimate in an exploratory study.

Summary

The present study was undertaken to investigate the strategies developed by five grade three teachers to cope with individual differences in time needed to learn. The investigation was conducted within the naturalistic research tradition. During the Fall term, observations were made on five days each week, one day in each classroom, over a ten week period. Major areas investigated were the organization for instruction (chapter 3), the extent of the differences in performance rates between fast and slow workers (chapter four), the rate of presentation of curricular material (chapter five), time allocation (chapter six), student time-on-task (chapter seven), and classroom activities (chapter eight). The purpose of the study was to document the
strategies used by teachers to accommodate individual differences and to reflect on what the identified strategies might reveal about classroom processes.

The research problem was formulated within a social-psychological framework of decision making. Teaching behavior was considered to be comprised of attempts to realize three goals, coverage, mastery and student cooperation, none of which might be achieved without compromising success at achieving the others. Coverage refers to the amount of curricular material to which students were exposed; mastery refers to the degree or depth of learning that students might be expected to reach; and student cooperation refers to the necessity of engaging student attention to the task at hand. In this study, the terms coverage, mastery, and cooperation were used in a relative, rather than an absolute, sense.

It was assumed that the classroom environment limited the range of behavioral options. Two constraining influences were considered: the differential time needs of students and the limited time available for schooling. The task of teaching selected for analysis was conceptualized as a dilemma between simultaneously meeting the needs of the individual and the needs of the group. In this study, the difficulties presented by diversity of student time needs and the limited time available for schooling were seen as reflecting the mastery-coverage dilemma.
The Mastery-coverage Dilemma

The heterogeneity in terms of student time needs, which is a characteristic of classrooms, presents the teacher with a fundamental problem: some children will require longer than others to cover or to master the curricular material presented to them. The extent to which the teacher emphasizes coverage or mastery was seen as having consequences for classroom management. If the teacher adjusts curriculum coverage to permit mastery by most of the class, she runs the risk of boring faster learners, and also of not covering the curriculum. Conversely, if she moves on before most of the class have mastered the curriculum, she runs the risk of superficial learning and frustration for the slower members of the group. The strategies adopted by teachers, to deal with this dilemma, were investigated.

Several strategies were identified which were used by teachers to cope with the problem posed by differential time needs. It was concluded that the primary strategy was to keep the class operating as if it were one organism. In order to accomplish this, it was necessary to prevent students from falling too far behind, or getting too far ahead, in the work for the grade level. A mastery rather than a coverage orientation, reflected in time allocated to finishing off and catching up, and in whole class teaching, permitted the class to be kept together. Similarly, homogeneity of pace, both in whole class and group teaching, was seen as preventing an increase in the variance of curriculum coverage.
It was suggested that these strategies may be interpreted as functioning to bring about a state of adjustment between the opposing forces of individualism and collectivism. In effect, it was suggested that teachers seek an equilibrium between the needs of the individual and the needs of the class. This appears to be accomplished instructionally by a tradeoff of coverage for mastery: managerially, by the provision of activities which engage the cooperation of the majority of the class. A major mechanism by which this balance is effected appears to be through the management of time.

**Time Management.**

In this study, teacher time management decisions were interpreted as responses to the diversity in student time needs and the limited time available for schooling. Two organizational strategies for dealing with the problem of differential time needs were identified: teaching the class as a whole and grouping for instruction. Whole class teaching simplified time management decisions: all students received the same amount of instructional time. Grouping complicated time management decisions as the time available for instruction had to be shared amongst the groups. In both cases, it was suggested that time management functioned to reduce potential achievement differences amongst students by equalizing curriculum coverage.

Time management aspects of classroom life also served
to emphasize the interdependence of elements within the social system. Because students have differential time needs, time used to ensure mastery of curricular material is time that cannot be used to advance coverage. Time management decisions that permit mastery of curricular material for the class as a whole, run the risk of losing the cooperation of faster working students; conversely, decisions that permit coverage by the class as a whole, run the risk of losing the cooperation of slower working students. It was suggested that time management decisions likely functioned to effect a compromise between the competing demands of coverage, mastery and student cooperation.

**Opportunity to Learn**

The notion of time as a limited resource implies that it can be used to achieve some goals but not others. Brown and Saks (1975) argued that two major goals of public education are the democratic ideal of stressing equality of attainment and the goal of enhancing individual differences. The conflicting nature of these goals may be examined within the context of the debate regarding equality of educational opportunity.

There appears to be general acceptance that opportunity to learn should be provided equally for all citizens (Coleman, 1968). Coleman (1968) argued that the concept of equal educational opportunity has undergone development, from primarily a focus on the provision of equal access to schools to a focus on equal effects of schools. Viewed from within a
production function framework, the concern has shifted from equality of inputs to equality of outcomes. The view of classroom reflected in the present study suggests that social-psychological processes which result from the collective nature of school may have a significant impact on equality of educational opportunity. In particular, teacher decisions which reflect a mastery rather than a coverage orientation, may be seen as reflecting the goal of equality of educational outcomes, rather than the goal of the enhancement of individual differences.

Brown and Saks (1975) suggested that these two goals have implications for the dispersion of student achievement outcomes. They argued that the notion of equality of attainment implies a "leveling", or decrease, in the achievement variance of the class: the idea of enhancing individual differences implies a "sharpening", or increase in achievement variance. Enabling individuals to achieve their potential requires that they be provided with the maximum opportunity to learn. In the framework adopted in this study, this requires that students be allowed curriculum coverage which is commensurate with their time needs. Opportunity to learn which accommodates individual differences in time needs, will likely lead to inequality of outcomes. The data in this study were interpreted as suggesting that meeting the differential time needs of students was not a realistic goal for teachers, because of the increase in management and instructional problems. Rather, teacher strategies were seen
as functioning to equalize curriculum coverage among students, which ultimately is expected to realize equal educational outcomes. It was argued that time spent on finishing off and catching up may be a denial of opportunity to those individuals who have already completed the work. Consequently, it is suggested that a mastery orientation, which functions to equalize outcomes, is at variance with the notion of the enhancement of individual differences.

**Optimization of Learning**

Optimization of learning for each student has often been seen as a major objective of schooling. This manifest function of schooling is reflected in philosophies which call for individualization of instructional programs; the focus is on increased learning for each student. It is suggested, based on the interpretation of the data in this study, that the class, rather than the individual, is the focus of teacher attention. In spite of a performance rate differential of approximately 1:2.5, teachers managed to keep 75% of the class occupied. It is proposed that teacher strategies seem more likely directed at the goal of optimization of learning for the class as a whole, rather than the goal of optimization of learning for individuals.

Optimization of the learning of individuals may lead to a sharpening of differences among students in terms of achievement variance. Sharpening of differences has the advantage of increasing the mean performance level of the class but at the cost of increased achievement variance.
(Atkinson, 1976; Brown and Saks, 1975). Conversely, optimization of the learning of the class may lead to a leveling of differences among students in terms of achievement variance. Leveling of differences will reduce variability but at the cost of decreased mean performance (Atkinson, 1976; Brown and Saks, 1975). This choice too has unfavorable consequences; presumably coverage will be reduced and high ability children will be bored. Atkinson (1976) argued that a more reasonable goal for teachers is to engage in behavior which leads to the maximization of the mean performance level of the class, without magnifying the differences. In an analysis of achievement data of grade four students, gathered as part of the Michigan Educational Assessment Program of 1970-71, Brown and Saks (1975) suggested that experienced teachers produce this result.

It is suggested that the objective of maximization of mean performance level, under the constraint of not amplifying variability, underlies the strategies adopted by the teachers in this study. Earlier (chapter six), it was proposed that resources will be allocated where the marginal utility is greatest. Maximization of the mean without increasing achievement variance requires that greater resources be allocated to children with high time requirements. It was suggested that teaching the class as a whole, which reflects a mastery orientation, accomplishes this, and provides the teacher with greater means of control over student cooperation or attending behavior. The cooperation of the majority of the
class was ensured by providing additional activities to keep fast finishers occupied; perhaps teachers tradeoff the learning of faster students for reduced variability. The goal of the maximization of the mean, without increasing variability, may have inherent appeal for teachers as it reduces classroom management and instructional problems.

Classroom Management and Cooperation

For practical reasons, the teacher has to ensure a degree of cooperation or attention from students. A degree of order and attention to the task at hand appear to be necessary prerequisites for learning. In this study, student attention or cooperation was assessed by on-task rates. Heterogeneity of time needs makes it difficult for teachers to maximize the attending behavior of all students simultaneously. An emphasis on either mastery or coverage runs the risk of alienating different segments of the class, which is likely to be revealed in off task behavior. A coverage orientation, geared to the time needs of faster learners, is likely to frustrate slower students. A mastery orientation, which might be expected to increase the cooperation of the slower students, is likely to bore the faster workers. It seems reasonable to anticipate that teachers will choose the alternative which augurs well for classroom management.

It seems that a mastery emphasis, geared to the time needs of the slower students, may be pragmatic in terms of classroom management. It is reasoned that cooperation, from the class as a whole, is probably facilitated to a greater
degree by a mastery, rather than a coverage, orientation. It seems likely that high achievers are better able to adjust to the demands of the slower pace inherent in a mastery orientation than are the low achievers to adjust to the demands of the faster pace inherent in a coverage orientation. The effect of a faster pace is likely off task behavior by low achievers because the difficulty of the work advances too rapidly. The effect of a slower pace is likely rapid finishing behavior by high achievers, because the difficulty level of the work does not match their ability. Off task behavior by the lower achievers is potentially more difficult to deal with, than the off task behavior by the higher achievers. The compromise which appeared to be adopted in this study was a mastery orientation together with the provision of additional activities for fast finishers. In effect, it is suggested that teachers may tradeoff coverage by the faster learners, for mastery by the slower learners, in the interests of securing the cooperation of the class as a whole.

The Teacher as a Utilitarian Pragmatist

A particular view of teaching emerges from this study. The problem faced by the teacher of conducting a class of learners, heterogeneous in time needs, through a curriculum, in a limited amount of time, was interpreted within the framework of utility theory. It was suggested that the goal of mastery of curriculum material for individuals is in conflict with the goal of coverage of curricular material for
the class. When goals are in conflict, the problem may be seen as one of value tradeoffs. The teacher, as decision maker, was portrayed as intuitively weighing the rewards and costs of both mastery and coverage. The rational model of decision making, in which the optimal alternative is chosen, was rejected as not reflecting the complexities of the classroom. A model of "bounded" rationality, involving "satisficing", or satisfactory alternatives, was preferred as a way of interpreting tradeoff decisions. This view generated a picture of the teacher as a utilitarian pragmatist, utilizing a mastery orientation, aimed at securing the cooperation of the class as a whole.

Utility theory explains human behavior as attempts to reach maximum utility. Maximum utility is reached at the point of equilibrium, where no further shifts in resources will bring about an increase in benefits or satisfaction. In this study, the allocation of the resource of time was interpreted within the framework of utility theory. Allocation of time to produce either mastery or coverage was seen as an attempt to reach the equilibrium point. It was suggested that time allocated with a mastery orientation likely enhanced teacher utilities to a greater extent than time allocated to coverage. It was argued that a coverage orientation is likely to lead to increased management and instructional problems, while a mastery orientation was seen as likely to reduce these problems. Consequently, a mastery orientation was seen as more likely to enhance teacher
utilities.

The hedonism inherent in this view of the teacher may not be without virtue. A picture of the teacher as a utilitarian pragmatist engaged in the trading-off of coverage and mastery, in order to secure the cooperation or attention of students, may illuminate some classroom processes. It was suggested at the beginning of this study that a fundamental difficulty faced by teachers was meeting the needs of individuals in a collective setting. The significance of the pragmatism of the teacher is that it may be an important facet in establishing an equilibrium between children with different time needs.

A Metaphor for Classroom Processes: Homeostasis

A particular view of classrooms emerges from this study. It is suggested that a principle from biology, homeostasis, may be used to describe, metaphorically, classroom processes. The principle of homeostasis asserts that in a complex organism:

all the vital mechanisms, varied as they are, have only one object, that of preserving constant the conditions of life in the internal environment (Claude Bernard, 1813 - 1878, quoted in Walker and Allen, 1971, p. 458).

In complex organisms physiological controls keep the internal environment from varying too much. Analogically, it is suggested that psychological processes involved in teacher decision making function to establish and maintain an equilibrium within the classroom environment. It is suggested
that some aspects of teaching behavior, the organization for instruction, the pacing of instruction, time allocation, and the selection of activities, may be seen, in part, as attempts to establish an equilibrium between the time needs of faster and slower students. It was argued that teachers trade off coverage, mastery, and cooperation in an attempt to ensure maximal teacher utility. Maximal utility, or the point of equilibrium, is accomplished by the manipulation of the marginal utilities of the variables concerned. As teaching seems to involve both some coverage and some mastery, trade-offs at the margin are likely to be small. Therefore, it is further proposed that attempts by the teacher to reach the point of equilibrium permitted by her preference structure may reflect a model of the classroom as a steady-state equilibrium, where parts of the system may change, but the overall characteristics remain the same. Hence, certain forms of classroom behavior, which achieve equilibrium, may persist across teachers and across time.

**Values and Opportunities**

It is appropriate to reflect on the consequences of a utilitarian view of teaching. It has been argued that a mastery orientation, which likely leads to the maximization of the performance of the class, without increasing the achievement variance, has utilitarian value for teachers in terms of classroom management. However, the consequences in terms of student learning may not be quite as felicitous. Strategies aimed at keeping the class together ultimately
likely reduce achievement differences amongst students. The enhancement of teacher utility may occur at the expense of leveling differences amongst students. The cost of maintaining an equilibrium between the needs of individuals and the needs of the class may be that the achievement levels of the most capable children are artificially depressed. This point has also been made by Shavelson (1976). Although he assumes that the decisions of teachers are intended to optimize student outcomes, he recognizes that teaching acts which minimize the stress of the teacher may not optimize student outcomes.

Utility theory implies that choices are made in accordance with value preferences. In this study, teacher decisions concerning the mastery-coverage dilemma were interpreted as related to the value preference structure of teachers. A model of the classroom as a steady-state equilibrium suggests an important distinction between choices which reflect unconstrained value preferences, and those which reflect values limited by opportunities. A recurring theme in this study has been that the collective nature of the classroom environment imposes constraints on the range of behavioral options. It is conceivable that the "leveling" strategies identified in this study do not reflect an inherent value preference of educators. Brown and Saks (1975) argued:
It is important to examine whether there are biases in the technology of education or in the preferences of school decision makers leading to choices of a wider dispersion of student outcomes (elitist systems) or to a narrower dispersion (leveling systems) (Brown and Saks, 1975, p. 572).

It seems not unreasonable, based on the analysis in this study, to suggest that differential time needs coupled with the limited time available for schooling, may promote the development of technologies or strategies which have an egalitarian, rather than an elitist, outcome. It may be that in spite of the bias to student differentiation, inherent in the philosophy of individual differences which gives substance to the manifest function of schooling, that the environmental constraints of the classroom lead to an increase in the similarities among students, rather than to an increase in the diversity.

**Implications of the Study**

It would not be unusual to find implications for action or practice, at the end of a study of this nature. Implications of a study, especially those which point to changes in established practises, may be premature. Previous research on teaching has been criticized because of its prescriptive emphasis which may hinder the development of an understanding of classroom processes (Dunkin and Biddle, 1974). As Brophy (1979) and Jackson (1968) suggested, it may be more appropriate to focus energy on understanding the
teaching process, before making an effort to change it. Accordingly, it is proposed that the significance of the perspective of the teacher as a utilitarian pragmatist, attempting to establish classroom equilibrium, may lie, not in immediate implications for practice but in how it influences conceptions of the process of schooling.

In spite of the caveat concerning the prematurity of implications drawn from studies of teaching, it seems appropriate to conclude with some indication of the potential fruitfulness of the current study. The analysis of classroom processes offered in the present study may influence, in a general rather than a specific way, the reflections of both practitioners and researchers. The presentation of teaching in terms of the mastery-coverage dilemma may serve to sensitize teachers and teacher trainers to the conflicts inherent in attempts to meet individual needs within a collective setting. The analysis in terms of tradeoffs and balance may lead to the understanding that compromises rather than optimal solutions are probably endemic to classroom decision making. The articulation of the time management issues inherent in the dilemma of meeting individual needs within a collective setting may contribute to increased understanding by practitioners, and perhaps lead to a more realistic appraisal of their influence. How far this may contribute to a change in classroom practices remains to be documented.

Although the fruitfulness of the current analysis is
considered to be limited for practice at the present time, the potential for future research may be more pronounced. The analysis of teaching in terms of tradeoffs of mastery, coverage, and cooperation points to the necessity of research in several areas. The purpose of this section is to indicate the possible thrust of research in areas which are likely to be productive for the development of an understanding of the mastery-coverage dilemma.

The significance of pace in terms of student achievement was reviewed in detail in chapter five. It seems appropriate in this concluding section to suggest that further work be directed at determining how teachers make pacing decisions. In the current study, only one teacher seemed to be aware of her influence on pace. This seems to suggest that pacing decisions may be made intuitively rather than rationally. A model of instructional pace as a rational response to the academic needs of children may not appropriately reflect classroom practice. Pacing decisions may be more appropriately reflected in a feedback model where student affective responses influence the speed at which teachers introduce new material. Specifically, the influence of different levels of cooperation or student attending behavior on decisions about when to move on may be worth exploring.

In this study, it was pointed out that because of differential time needs, a pace of instruction may not be optimal for all students. This proposition directs attention
to the heterogeneity or homogeneity of the class, and how this may be related to pace, or may influence pacing strategies. It seems reasonable to hypothesize that greater heterogeneity may be associated with a slower pace of instruction and conversely, that greater homogeneity may be associated with a faster pace.

The extent of variability within a class may be demonstrated objectively, for example, by the use of achievement tests. However, it is important to consider that the variability perceived by teachers may not accurately reflect the state of nature. The reader is reminded of the notions of leveling and sharpening introduced in chapter three to explain classroom organization. It seems reasonable to consider that teachers may perceive greater homogeneity than is reflected in achievement tests, and therefore teach the class as a whole. Conversely, they may perceive greater heterogeneity than is reflected in achievement tests, and attempt to individualize. Teacher perceptions of homogeneity or heterogeneity may prove significant in terms of instructional pace. In this study, a faster pace appeared to be associated with whole class teaching, and a slower pace with attempts to individualize.

In this study, whole class teaching also appeared to be associated with higher levels of attending rates; classes in which there was a greater amount of whole class teaching had higher on-task rates than classes in which there were attempts at individualization. This seems to suggest that whole class
teaching may be an efficient way of keeping the majority of students on-task. An investigation of the strategies used by teachers who are adept at securing high rates of attending during whole class teaching might be worthwhile. Based on the data in this study, it is suggested that the degree of active rather than passive student participation in whole class teaching is likely to influence rates of attending. For example, it is anticipated that activities which provide for responses by all students simultaneously, rather than responses by individuals in sequence, will contribute to higher on-task rates.

A recurring theme in the present study has been the possible significance of time management decisions. In this study, only Teacher 2 allocated time equally to students, while the others allocated time unequally. The suggestion in the current work was that time allocation may have significance for student achievement. Specifically, time allocated equally is hypothesized to increase achievement variance, while time allocated unequally is hypothesized to reduce achievement variance. Similarly, it is anticipated that time management strategies directed at providing extra time to lower achievers is likely to reduce achievement variance. Consequently, classes in which greater time is allocated to finishing off and catching up would be expected to display decreased achievement variance.

The economic framework of the current study presents a view of mastery and coverage as having nonindependent
utilities. Clearly, future research must address the question of the relationship of teacher value preferences to mastery-coverage tradeoffs. The question of how egalitarian or elitist views of society are related to degree of coverage and degree of mastery for different segments of the class seems to be a possible line of inquiry. It is hypothesized that egalitarian views of society are likely to be reflected in a mastery orientation, while elitist views are likely to be reflected in a coverage orientation.

Another possible line of enquiry involves the investigation of the conditions under which coverage is reduced, the extent of the reduction, and the ramifications for student achievement. It is hypothesized that greater heterogeneity is likely to be associated with decreased coverage while greater homogeneity is likely to be associated with increased coverage. It is anticipated that when coverage is reduced topics or objectives which are essential to continued student progress through the curriculum are more likely to be introduced than the more peripheral topics.

Similarly, how different levels of mastery are related to the achievement of students of different levels of ability is an area of potential importance. It is anticipated that attempts to have the majority of the class reach a high level of mastery is likely to be associated with a slower pace and lower mean achievement. Conversely, it is expected that a lower mastery level for the class as a whole will be associated with a faster pace and increased mean achievement.
A Critical Perspective

In the concluding discussion to *Life in Classrooms*, Jackson (1968) predicted that as a result of an increase in observational studies, there was likely to be the emergence of several critical perspectives from which to view classroom events. In the present study, strategies for dealing with individual differences in time needed to learn were viewed from within the framework of utility theory, and an equilibrium model for understanding classroom processes was proposed. Jackson (1968) suggested that the significance of a perspective might lie in how well it leads to reflections on the operation of schools.

Two notions, balance and tradeoffs, the former inherent in the concept of equilibrium, the latter inherent in the theory of utility, may influence reflections on schooling. Inherent in the notion of tradeoffs is the idea that gains in any area may only be accomplished by sacrifice in others. This suggests the notion of compromise. Shavelson and Stern (1981) suggested that little is known at present regarding how teachers balance potentially conflicting goals. In this study, teaching was portrayed as involving tradeoffs among mastery, coverage, and cooperation in order to effect a balance between the time needs of individuals and the time needs of the class. It was suggested that the strategies used to effect this compromise may have consequences for student learning. The greatest strength of an equilibrium model of classroom processes may be that it directs attention to the
necessity of balancing conflicting goals. In this study, the model was found useful for analyzing the strategies used by teachers to cope with individual differences in time needed to learn. It is hoped that the adoption of an equilibrium model in future research will further illuminate classroom processes.
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APPENDIX 1 - A DESCRIPTION OF THE SAMPLE

In this appendix the schools, children, teachers, and classrooms are described in detail in order to enable the reader to make judgements concerning the generalizability of the conclusions arising from the observations.

The Schools

The schools in which the observations were conducted were situated in the lower mainland of British Columbia. The schools varied in population size from 80 children in kindergarten to grade three, to over 500 children in kindergarten to grade seven. The buildings appeared to be kept in good repair and the absence of garbage, both inside and outside the schools, contributed to the well-cared for impression. Four of the schools were surrounded by large, grassy playing fields. The fifth school, the smallest, had an adventure playground as a playing area.

The schools were situated in middle class to upper middle class residential areas. The area surrounding each school consisted of large, single family homes on landscaped lots. Comments made by the teachers confirmed the impression of a flourishing bourgeoisie. One teacher described the population as "nouveau riche"; the people had made their money in business and were now purchasing homes in well-established, residential areas. Another teacher commented that most of the parents were business people or executives, and were concerned that their children did well in school. Another teacher, to emphasize the stability of the area, commented that all her students came from intact families, while it was her understanding that other schools in the district had many children from single parent families. All the schools had a substantial number of parent helpers, usually mothers, who did volunteer work during the day, and two schools had active Parent Teacher Associations.

The Children

The appearance of the children reflected the prosperity of the residential areas in which the schools were situated. All the children looked clean and well-dressed. At each school it was expected that the children would change for Physical Education, and all of them appeared in the gym, dressed appropriately.

The children interacted pleasantly with their teachers and with other adults around the school: no insolence or use of foul language was observed. They also interacted pleasantly with their peers. Sharing of supplies, and offering to help each other, were common occurrences. Only two instances of mischief were observed: one child attempted,
unsuccessfully, to trip another, and two children argued over who was to use a ruler. Most adults would probably find it very pleasant to spend time with these children with well-scrubbed faces and polite demeanor. Not unexpectedly they were often described by their teachers as "good" children.

The Teachers

In age the teachers varied from late twenties to mid-forties. There was also considerable variation in the number of years of experience from 3 years to 27 years (Table A). All of the teachers had taught more than one grade, although most had worked mainly with primary aged children. In terms of training only one of the teachers had completed a Bachelor's degree in Education. Another anticipated finishing the requirements for a degree by the end of the current academic year. Of the remaining three teachers one had three years of training in a university while the other two had taken the bulk of their courses in a normal school.

Table A

<table>
<thead>
<tr>
<th>Teacher</th>
<th>Training</th>
<th>Experience</th>
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<tbody>
<tr>
<td></td>
<td># of years</td>
<td>Grades taught</td>
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<td>1</td>
<td>4 yrs. University</td>
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<td>+ additional courses</td>
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<tr>
<td>2</td>
<td>2 yrs. Normal school</td>
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<tr>
<td>3</td>
<td>2 yrs. Normal school</td>
<td>27</td>
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<tr>
<td></td>
<td>+ additional courses</td>
<td>2 and 3</td>
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<tr>
<td>4</td>
<td>3 yrs. University</td>
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<tr>
<td>5</td>
<td>5 yrs. University</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>B.Ed. degree</td>
<td>1, 2 and 3</td>
</tr>
</tbody>
</table>

The Classrooms

We might at first be attempted to agree with Philip Jackson (1967) that "Even devoid of people a church is a church and a classroom, a classroom" (p. 6). The ubiquity of chalkboards, desks, books and even hooks for coats may seduce the novice into believing that a classroom is after all a classroom.

Similarities tempt: they offer reduction of cognitive
complexity and an economic means of storing information in memory. The skeptic might argue that the cost of simplicity far outweighs the price; to find similarity necessarily means glossing over diversity. The perceptive might protest that true art lies in finding diversity within sameness: Chartres cathedral and the Anglo-Saxon chapel on the island of Lindisfarne are both churches, but the vision of man and his relationship to God are profoundly different. Just as church architecture reflects Man's view of himself as worshipper so Getzels (1974) has argued may classrooms reflect Man's view of himself as learner.

Getzels (1974) proposed that the images of the classroom reflect visions of the learner. He offered four images of classrooms and of learners. The rectangular classrooms, built at the turn of the century by architects determined to provide enough light to the occupants, reflect a view of the learner as an empty organism. Children as "tabulae rasae" were seated in desks bolted to the floor, and faced an omnipotent teacher who was the fount of all knowledge. The square classroom with moveable desks reflected the Gestaltian notion of the learner as actively seeking meaning. This view of the learner as cognitively and affectively "alive" paved the way for the image of the classroom as circular and a vision of the child as a social learner: moveable desks were replaced by tables which could be grouped into circles to permit social interaction. Finally, Getzels commented on the open classroom as an environment for a stimulus-seeking learner: the homeostatic model of behavior which dominated the older views of learners is rejected in favor of a ceaseless curiosity. These images of classrooms, whether or not they reflect or shape our vision of the learner, provide a means by which to see the diversity which exists within similar architectural forms.

In general terms the five classrooms were physically similar. All were supplied with an adequate number of desks, tables, chairs, chalkboards and books. It was in the deployment of these resources that differences became apparent, and which suggested similarities with Getzel's typology.

Two modes of description readily spring to mind: the objective and the subjective. The former mode of description is usually the province of the scientist, the latter, the province of the novelist. While the statistics offered by the scientist have the advantage of precision, we may be left feeling that we know more than we really want to about things. The novelist works in a different fashion, creating, from nuances or le bon mot, portraits which remain in memory long after the scientist's numerals have faded. The art of the good novelist is such that often as readers we know more than we can find words to express.
The two modes of description, the objective data of the
scientist and the subjective impressions of the novelist, are
often seen as incompatible: the one belongs to the world of
fact, the other to the world of fancy. Between these two
worlds a mutual antagonism is supposed and a vast,
unbridgeable chasm is imagined. Adherents promulgate the one
as bad, the other as good, and personal preference takes the
place of judgement as to how well either fulfills its purpose.
When no good reason dictates a choice between objectivity and
subjectivity, then precision and impression, in alliance, may
create a richer picture. Accordingly the five classrooms are
revealed through the eyes of the observer.

Classroom 2: Rectangular Classroom and Empty Learners?

The dominating spirit in this room was one of neatness,
orderliness and regularity. Desks were organized into rows
which faced the chalkboard. The teacher's desks was tucked
neatly out of the way in a corner of the room. Extra chairs,
neatly stacked at the back of the room, were placed in a semi-
circle around a second chalkboard for the daily reading
circle. At the conclusion of the reading lesson a monitor
restacked the chairs. Reading textbooks were kept on a book
trolley near the reading circle. Encyclopaedias and
dictionaries neatly lined the shelves beneath the windows.
The ease with which teacher and students retrieved the
material renders inappropriate the suspicion of an intense
concern for orderliness: the neatness was functional.

The physical orderliness of the room was matched by a
regularity in the events of the day; lessons were started and
finished according to the clock. A timetable on the wall,
mute overseer of events, bore silent testimony that the
activities of the day conformed to a plan. Within lessons the
routine of removing books from desks, writing the date,
participating in the discussion, completing the assigned work,
and replacing books in desks, provided a psychological
constancy which matched the physical regularity of the
organization of the room.

Regularity, or constancy, was also a hallmark of the
teacher's behavior. The beginning of the lesson invariably
found her in the front of the room. This area became her
podium from which she conducted the lesson. As soon as the
children began their written assignments she began a slow,
methodical progression up and down the rows, offering advice
and encouragement, and marking the work.

The arrangement of furniture in this room was
functional in that it facilitated a particular style of
teaching. The teacher, by nature of the the organization of
the class, was often at the centre of the child's field of
vision. The regularity of the layout gave the teacher a
commanding view of the activities of the learners.
Paradoxically, the possibility for power which this central position afforded seemed to reduce the necessity for explicit control.

The classroom of Teacher 2 reflects the image of the rectangular classroom, children in straight rows facing a teacher who controls the activities. Does this image of the rectangular classroom necessarily imply a vision of the learner as an empty organism? Several times Teacher 2 expressed delight at the extent of the information possessed by the children in her class. She gave them opportunities, not only to share their experiences, but to add to their knowledge by consulting dictionaries and encyclopaedias. During lessons, she stressed that independent thinking was important and would require that the children respond to problems in writing, before they were discussed by the class as a whole. Far from viewing the learner as an empty vessel waiting to be filled, Teacher 2's view of the learner appeared to be that of an organism actively seeking enlightenment.

Classroom 1: Square Classroom and Active Learners?

The classroom of Teacher 1 was not completely self-contained. Although physically separated from other teaching areas by being raised, this classroom was open on one side to permit access to a small library which was shared with the rest of the school. For four mornings a week the children pursued a regular grade three program. On the fifth morning and during each afternoon the school was organized into "family" groups (mixed age groups).

The staff of this school generally espoused a philosophy of education which stressed social integration, and which saw the child as an active learner. Projects and large scale group friezes, or murals, were the usual products of the family grouping time. In order to work in groups, it is usually necessary for children to be physically close. Teacher 1 had abandoned the formal rows of the rectangular classroom, but appeared not to have found a physical arrangement which was satisfactory. At the end of September, when the initial observation was made, the children's desks were in groups of four except for one child who had requested to be by himself. This child had positioned himself so that he faced a chalkboard: the other children faced each other. During succeeding weeks, the groups were gradually fragmented into pairs, with additional children relegated to solitary confinement in the nether regions of the room. The physical separation of the desks was accompanied by transference of pupils to different parts of the room. None of these ploys solved the basic problem. Physically, the room encouraged social interaction, but the work which was assigned, demanded long periods of independent seatwork. These conflicting demands were not resolved by either the students or the teacher. In the classroom of Teacher 2 a match between the
physical arrangement of the room and the teaching style led to a highly stable physical environment. In the classroom of Teacher 1 the lack of concordance between form and function appeared to be responsible for a highly unstable physical environment.

There was also a certain instability in the apportionment of time to the various activities which made up the school day. Each day opened with an assembly of the whole school, but the length of time devoted to this activity varied. At times the themes developed in the assembly were carried over into the classroom. Family grouping times also spilled over into the time for the regular grade three academic program. As a consequence of the time devoted to non academic pursuits the children in this room were continually "catching up". As soon as they had finished the assigned work, there was always another activity, left over from a previous lesson, to be completed. On some occasions, time for lessons was so curtailed that a choice had to be made between arithmetic and Language Arts. The lack of adherence to a timetable, and the tendency for other activities to take precedence, contributed to the feeling that the day did not contain enough hours for all the activities to be completed.

Classroom 4: Circular Classroom and Social Learners?

The classroom of Teacher 4 represented an amalgam of some of the characteristics of the rectangular classroom and the square classroom. Children faced the front of the room, where Teacher 4 was often to be found, but the desks were in pairs and arranged in groups of eight. As the desks were constructed to be exited from the left-hand side, the pairwise arrangement required half the class to extricate themselves by swinging over the bar which secured the seat to the table part of the desk.

Teacher 4 clearly had notions of when the eyes to the front regimen, facilitated by the orientation of the desks, was required and when the socialization encouraged by the closeness of the grouping arrangement, was to be permitted. The rule appeared to be that when the teacher was at the front of the room, giving a lesson, reading a story, or giving directions that the frontward orientation was in force. Unless instructed to the contrary, "neighbourliness" was allowed during periods of seatwork. That socialization between children was considered important by this teacher, is attested to by the fact that changes in seating arrangements were made, because certain of the children "weren't getting along". Major seating changes were made several times during the ten weeks of the observations.

A relaxed atmosphere prevailed in this room. The assignments, which usually included a coloring component, and the provision of games for those who finished their work
quickly, enabled time to be passed quite pleasantly. Time appeared to be available in abundance. The students were often told not to hurry with their work, but to take their time. When students demonstrated interest in an assignment, extra time was made available to them. The leisurely atmosphere prompted the question as to what extent the assignments were merely pleasant time fillers; often work was collected in "finished or not".

Classrooms 3 and 5: Open Classrooms and Stimulus-seeking?

Both Teacher 3 and Teacher 5 believed that their classrooms were non-traditional. Teacher 5, the marker, described her program as individualized and Teacher 3, the supervisor, saw hers as following the dictates of the integrated day of the British Infant school. While differing in several respects, both rooms shared a common characteristic. The initial view of both rooms gave an appearance of a haphazard arrangement of an assortment of desks and tables. Closer inspection revealed that the desks and tables which were grouped together were labeled as "centers" (areas set aside in which children could work on specific subjects). The organization of classrooms into centers generally connotes a community of peripatetic students who rotate through the different areas. The children of Teacher 3 were mobile, but the children of Teacher 5 were assigned to specific places in the room. The mobility in Teacher 3's room required that the children's supplies be kept in tote trays which were stored on specially constructed shelves. Several of Teacher 5's children were also obliged to use tote trays, as they had been assigned to tables rather than desks.

The introduction of centers into a classroom often represents a move away from the concept of teacher as fount of knowledge, and a move towards the notion that children are able to learn from a variety of sources. Centers are usually provided with an abundance of materials, and children are encouraged to work together: the natural curiosity of the child is seen as a motivational prime mover, and children are regarded as seeking stimulation. The most curious aspect of these rooms was the extent to which both teachers had attempted to inhibit the natural intercourse of children. Both classes were well-supplied with dividers, and furniture was also used to partition the rooms. The presence of these dividers, an observer's nightmare, obstructed a clear view of the rooms, and required continual perigrinations in order to maintain surveillance of all the children. The teachers saw the dividers as necessary to keep the materials in each area separate (Teacher 3), and to keep the eyes of the children on their own work (Teacher 5). As well as inhibiting visual contact with all parts of the room, the dividers functioned as unnatural barriers which impeded physical progress across the room. Once again form and function seemed awry: educational
philosophies which saw the learner as stimulus-seeking were confined in physical environments which attempted to impose isolation.

The presence of physical barriers in the room, which were intended to isolate learners from each other, ironically, more often tended to shield the children from the eyes of the teacher. Both teachers frequently expressed irritation, because of the noise made by the conversation of children they could not see.

Stimulus-seeking can take place cognitively as well as socially, and perhaps the inhibition of the former is potentially more detrimental to achievement than the latter. Teacher 3 provided a variety of materials, workcards as well as concrete materials, in her centers. The difficulty lay in that not enough material could be provided at a fast enough rate to satisfy some children. Once they had completed the work provided, there was little to do except draw pictures. It is this inhibition of cognitive stimulus seeking which is perhaps a more telling form of isolation.

Although in some respects the two classrooms were similar, they differed greatly in the use of time. In the room of Teacher 3 work appeared to expand to fill the available time. The children seemed to meander from one activity to the next, with little manifestation of a concern for time. Some children finished their work quickly, and spent the remainder of the day in drawing and coloring. The majority preferred a leisurely pace, interspersing work with gossip of a social nature. Consequently, the morning work often spilled over into the afternoon.

The leisurely pace of Teacher 3's class is to be contrasted with the frenetic activity of Teacher 5's room. The cycle of work, tote tray, mark, and correct provided a treadmill which many of the children seemed unable to escape. Two kinds of children managed to have parts of their day unafflicted with the demands of the tote tray. Some children finished all of the requirements rapidly, and then were free to draw or paint. Others remained aloof from the cycle by working so slowly that they only finished their work at the end of the morning. Their work was marked during the lunch hour and they spent the first half hour of the afternoon correcting it. Thus, by working very quickly, or very slowly, a few children managed to control their use of classroom time.

Curricular Materials

The classes were provided with the curricular materials in use in British Columbia schools (see Appendix 5). Only one teacher, Teacher 2, chose to use an older, non prescribed reading series. She used a different reader at the beginning of the year as a transition to the prescribed material which
she found initially too difficult for grade three students. In addition, the rooms were supplied with an assortment of workcards, reading kits, encyclopaedias and other books.
APPENDIX 2 - NARRATIVE SPECIMEN RECORD

Class 3 9/12/80 Visit 10

09:20 Handwriting in progress. Children are in desks practising. Teacher circulating--helping. As children finish they put away books. One child approached Teacher who responded "I'm busy". Children who have finished are now doing Christmas booklets. Have to record their activities in this booklet as they finish them. Children have been assigned to centres. Assignment is written by the teacher in the green Christmas book. Teacher tells students "When you have finished the assignment (handwriting) go to the area that you have been assigned to".

09:35 Teacher called up spelling group 3. Announces to the class "Now I have 5 spelling groups the dictation is going to take a bit of time". Group 3 spelling group have to wait while Teacher shows story writers what to do. Teacher finding out who has been assigned to which area--checking up to see if children are doing the right thing.

09:43 Spelling group waited approximately eight minutes for teacher to come and dictate words.

09:45 Children are making paper chains (4), doing number booklets (5), writing stories (3), copying printing (3), copying up good copy (2), L.A cards (1) and spelling dictation (4).

09:47 Dictation finished. Teacher explained how to do spelling cards.

09.47 Called up another spelling group (using card 4). Told to start card 5 next week. Dictation.

09.53 Called up another spelling group (card 5) for dictation.

09.59 Another spelling group for dictation.

10:04 Another spelling group. She must have made up these
groups to have a mixed range of ability. Observer asked teacher how the groups had been formed. Teacher responded that children chose the cards they wanted to do. She described the groups as "democratic". She picked the names out of a hat and let them select one of five cards. Teacher commented on the use of dividers to separate or provide privacy. She separated N. and S. commenting "I know you're friends but you don't work well together".

10:14 Teacher called up a reading group. "Yesterday I had eleven people who read the story to themselves". Not enough books so K. went off to get some more. I hadn't seen these books in use in this class before. Old readers called Up and Away. Teacher preparing to hear reading. She assigned parts to be read to all children before hearing the oral reading. Teacher questioned whether N. was in the group. Instructed children to each read their paragraph silently first. Called upon L. (chronic slowpoke) for talking to L. and M. M.B. is doing number 15 of Developing Comprehension in Reading. Teacher asked A. if he had finished number 19. She still must be waiting for people to finish the second section of Dev. Comp.

Recess break. Teacher reported that she had abandoned the Ginn readers until after Christmas because there was no Christmas story. She was doing a story from Up and Away (old grade 4) reader about a dog and some Mounties. The Mounties had been in the school on the previous day to talk to the children. Teacher reported the Christmas spelling groups were made up randomly--children selected cards to begin with. She reported she used Christmas books last year to record the work done. Is using them again during the Christmas period and children can take them home. Children required to specify what they want to start on the next day--Teacher has veto.

10:45 After recess Teacher continued with the reading group. Other children continued with other work. The same two children are folding paper chains--having a hard time keeping at it. L. and L.F. have both asked for help this morning. L. has asked before and I've always told her to use a dictionary.

11:01 Group dismissed to seats. Teacher announces to the class "Everybody else who hasn't read from this reader put everything away because by the time we're through the reading it'll be gym time". Group got same reader and same story. K. approached teacher for help--"Just wait
until I've finished here". Teacher assigned silent reading p. 178-179 to group. Same story, but a different way of handling the reading. Why wasn't this done as a whole class activity? Continued to assign 1 or 2 pages to be read silently, then discussed it. Children seek help from other adults or from each other. N. brought math card across to L. and got help. In the group doing the silent reading children have to wait until the teacher begins asking questions--usually when most people have finished reading.

11:20 Reading group dismissed. K. up at teacher getting help with math card. Teacher showing K. work at board. N., C., and L. watching. Teacher illustrates concept of place value with an odometer example on the board. What has to be done each day in spelling is outlined on five cards shaped like Christmas trees and placed in the spelling center. The words are all Christmas words on the assignment cards.

11:24 Teacher instructs class to get ready for gym. Teacher still busy with K. C. and L. watching.

11:25 Teacher's attention directed to the class--fussing at door. Called class over to her and then sent them back to the door. Children had to wait approximately five minutes because teacher busy with K.

N.B. Supposed to have done place value. Working on it last time--card made from grade two program. Children very quiet this morning after recess - appeared to be settled and busy - did much of the work this morning involve low costs and high rewards?. Why did teacher take class in two groups to do the reading? For management reasons? Why have first group do oral reading after they had read silently? Why didn't they have a discussion comprehension question? Can I classify tasks in terms of rewards and costs to children - look at on-task in relation to type of task.

13:00 After lunch children came in and began reading library books. Teacher left the room. Children continued what they were doing--very quiet. N. identified (by teacher) as not doing what she was supposed to be doing--"You're always a nuisance". N. contacted teacher as soon as she came back into the room. N. not the only one who isn't reading.
13:14 Teacher in chair also reading. During teacher's absence children wandering, choosing books, discussing books in small groups class. Now very settled. Only the children behind the dividers are talking. Two children looking at each others books. Some children choose Owl, Highlights, or World (magazines). M. doing a puzzle in World. R. watching teacher--whispers to P. when Teacher's back is turned.

13:20 Teacher finished reading--checking some papers.

13:25 Announced to class "put the books away". Children went to meeting corner without being told to. Group one's turn to share (news time). Class waiting until "sharers" are ready. Children read from books. Given paper to record but have to wait until the sharing is through. Teacher is selecting some children to copy up the previous recording on large papers--do copying up with ballpoint pens. Directed to pass papers on to other children--named by teacher. J. returned from getting photograph--hasn't paid for it so it has to be returned to the school. Teacher tells the remainder of the class that there are a few things to be done. Spelling, printing, counting books (recording numerals to 1000). She tells them that if all that is done then they may read a library book or finish off work from the morning.

13:35 Class dismissed to work. Teacher spoke to N. and L. at filing cabinet. They were looking for work that had been previously filed. Several others not settled to work.

13:44 Teacher settling in to checking the counting books. Teacher calls up children as she has checked each counting book. Teacher comments to the class "Nice if we can get them finished".

13:50 Called up R. to bring recording book. Told her to go and work. Others at the same table also not working (N., M. and P). K. getting help from teacher with math work card.

14:00 N. told to leave Language Arts card and catch up in number booklet. Told only to go to 300. "You won't reach a thousand by this time next Christmas". M. and C. asking teacher what they should do.
14:15 Asked G., K., and C. to bring green (recording) books to the teacher--"As you have things finished". Teacher outlining to M. how she can take Developing Comprehension in Reading home and do one exercise each night at home, one during the day at school so she will be up to number 19 by the end of the week.

14:35 Teacher still checking counting books and recording books. Teacher gave M. Counting book to take home--to do one or two pages.

14:40 Teacher told children who hadn't done green books to do them now. Three children playing with chalkboard erasers at the back of room-- now in cloakroom. Other finishers are doing Christmas cards.

14:45 Teacher asked for rest of green books. Told class to clean up and go to the meeting corner. Children have various classroom jobs--stacking chairs, cleaning chalkboard erasers, tidying up tables etc. All jobs done without supervision or direction.

14:50 Eight children waiting in the meeting corner. One child still working. Teacher at circle--waiting.

14:52 Twelve children ready. Teacher called for rest of class to be ready.

14:54 Teacher started reading a story when 16 children were ready.

15:00 Finished reading the story. Read one page of the green booklet to the children and commented "good job". Children were dismissed to the cloakroom according to the date of their births.
General Comments

There were several changes which had taken place in the classroom program. The changes seem to reflect a concern with keeping children busy rather than a purposive approach to learning. The reading books had been abandoned in favor of a story taken from a grade four reader which is no longer in use. The readers were abandoned, "because they had no Christmas story in them". The children were reading a story in this new reader about a dog who worked for the mounted police. (The R.C.M.P. had visited on the day previously). There was no Christmas story in this book either. The teacher had all the children read the same story. This is particularly remarkable when one considers that she had just finally moved the LAC group into the easier Ginn book (grade two level). She also did not teach the story to the whole class at the same time. The first group she called up had already read the story, silently, on the previous day. She portioned out passages to be read out loud by each student and then proceeded with round robin reading. The children were less than attentive. With the second group, she gave them only one to two pages to read at a time, and then asked them a few questions, presumably to test comprehension. This group, which contained the poorer readers, did not do any oral reading. I suspect that it would have been too painful to listen to children struggle through material two years in advance of their achievement level.

The spelling program had also been abandoned (these children had also just been grouped in spelling). Instead the teacher had then select teacher-made cards involving the spelling of Christmas words. The children had therefore "democratically" grouped themselves into five groups. The teacher spent some time testing each of the groups (45 minutes to be precise). It is hard for me to rationalize why the teacher chose to reorganize in this way, considering the expenditure of time involved which her comments to the class revealed she had anticipated. "Now I have five groups the dictation is going to take some time". These cards represent part of her Christmas theme which she had made two years ago in conjunction with another teacher. Because of the thematic nature of the material, it can only be used at this time of the year. Perhaps this decision to abandon the regular work reflects teacher tendency to use the resources available. An additional advantage with this particular material, is that once it has been made, and the teacher has introduced it to the class, it is self-sustaining. The children had five cards which they could cycle through (enough work for five weeks), without further teacher intervention, except for testing.

The teacher had introduced another change which I think
reflects this tendency to expediency. The children had little teacher-made notebooks in which they were to record the activities of the day—post hoc rather than a priori recording. She reported that last year she had used this system all the time, but had decided to let these children do it so they had a record of their Christmas work to take home. As a recording system, this consumed a lot of class time which might better have been used in a different manner. Many children recorded each activity as they completed it, but others didn't. Towards the end of the day the teacher had all children stop what they were doing, and fill in their booklets. She also spent quite a bit of time checking the booklets and writing in them which activity was to be pursued first in the morning.

The afternoon in this classroom again demonstrated a major difficulty with a self-paced program of this nature. The teacher spent her time in marking, and in redirecting children who were finished assignments into other activities to keep them busy. She also expended some energy in cajoling reluctant workers into finishing assignments. I think that in order for this type of program to run smoothly, the teacher would need some kind of system where children checked off completed work, so that the teacher could see at a glance what needed to be done, and by whom.

Rewards and costs of activities

It is perhaps possible to look at the variety of classroom activities in terms of the rewards and the costs to both students and teachers. It seems reasonable to propose that students will prefer activities which are easy (low cost), and for which rewards are high (reward is either intrinsic or get lots of teacher approval—stickers, work displayed in the room etc.). It seem equally as feasible that teachers will prefer activities which require little preparation and are easy to implement (low cost), and for which the rewards are high (many children kept quietly occupied for as long as possible). I would anticipate that the best of all possible worlds would be a congruence between teacher and student rewards and costs. Therefore, I would anticipate that activities which are high in rewards, and low in costs, for both teachers and students, will tend to be repeated. It should be possible to investigate this idea using the data I have. I could classify activities in terms of costs to teacher (ease of implementation, amount of material required etc.), cost to student (assuming academic tasks are higher in cost than non academic), and looking at on-task as reflecting rewards. (I'll assume that high on-task reflects student satisfaction, and as a desirable state for teachers, also represent rewards to teachers).

The notion that perhaps academic activities are higher in cost raises the question of how some teachers get children
to engage in them anyway. A simple answer might be that they increase the rewards, but a more interesting approach might be to ask how they reduce the initial cost, and prevent an increase in cost due to fatigue, boredom etc., once the activity is initiated. Reduction of the cost of an activity (to the student) is perhaps effected by increasing the amount of teacher structure, pacing etc. Reduction of student cost is probably associated with an increase in cost to the teacher in terms of preparation time, teaching groups, instruction time etc. Whether teachers are willing to pay the cost probably depends upon whether they perceive the goal as worthwhile. The increased cost to the teacher may in the long term provide rewards in the form of increased student learning. It is interesting to speculate at what level of reward (on-task) teachers will choose activities to realize long term goals (increased learning) as against activities which secure the shorter term goal of keeping students busy.

Given that teachers do not opt for either academic or non academic activities solely, but tend to use a mixture, it becomes possible to ask about the balance between the two types. This may reflect the relative emphasis on short term as opposed to long term goals. It seems reasonable to suggest that the ratio of one type to the other may reflect the level of satisfaction or rewards experienced by participants.

It should not be concluded that rewards and cost are completely stable. Continuing the economic metaphor, one would anticipate changes in the perception of rewards and costs according to the current state of the market. Teachers may regard the increased costs to initiate and sustain academic activities to be worthwhile, when there is the possibility of compensating rewards (i.e., around report card time, towards the end of the year). Also, increasing maturity on the part of students could function to reduce the cost of implementing some activities. (Here I'm thinking of the way many grade 2 and grade 3 teachers will leave what they perceive to be the harder parts of the curriculum til later in the year).
APPENDIX 4 - QUESTIONS

Variability in Time Needed to Learn

How does this class compare academically with other classes you've had?
How does this class compare behaviorally?
Do you have some children who seem to need a lot of time to finish assignments?
Who are they?
Do you have some who never finish?
Do you have some children who seem to finish quickly?
Who are they?
How much time do you think the slowest 25% take compared to the fastest 25%?
Do you find the differences in time needed to finish assignments to be a problem?
How do you cope with the differences?
When you give the whole class assignments do you usually wait until all have finished?
How many do you usually like to finish before you stop them?
What do the ones who finish early do?
What do you do about the ones who don't finish the assignment?

Organization for Instruction

Why do you group in reading?
Why don't you teach the class as a whole in reading?
Does one group take up more of your time than the others?
How many groups do you usually work with in one lesson?
What kinds of things do you do with the whole class?
Do you have a particular way of organizing the reading lesson?
How do you organize the class for spelling?
What are the advantages of doing spelling in this way?
What are the advantages of teaching the class as a whole?
How do you manage to keep them all at the same place in spelling?
What are the advantages of grouping in arithmetic?
What are the disadvantages of grouping in arithmetic?
Which children take the most of your time in arithmetic?

Pace in Reading

Do you read the stories in order?
Are there some stories that you omit or leave to the end?
What do you think about the amount of reading material the grade three's are expected to cover?
What kind of supplementary material do you use?
What kinds of things cause you to miss reading lessons?
What do you do about missed lessons?
Do you plan how much you want to get through in a certain amount of time?
Have you found yourself getting behind your schedule this
year?
Why did you get behind?
What did you do about it?
How many stories do you cover per week?
How do you decide to move on to the next story?
How do you know that you've spent enough time on a story?
Do you have enough time to do everything that is supposed to be done in reading?
What kinds of things do you leave out?
If you had additional time what kinds of things would you do?
How do you decide you've spent enough time teaching the skills associated with each story?
Do you have a child who doesn't seem to fit in their group?
Is there a child in each group who just doesn't seem to understand?
Is there a child in each group that you can always count on to understand?
If you had to choose between covering all the stories and skills in the book, or making sure that most children had really understood a lesser amount, which would you choose and why?

Pace in Arithmetic

Are you following the sequence in the book? Why not?
How did you select the topics that you are teaching?
Are there some units or topics that you are omitting?
Are there any topics that you leave to the end?
What do you think about the amount of arithmetic the grade threes are expected to cover?
What kinds of supplementary materials do you use?
What kinds of things cause you to miss arithmetic lessons?
What do you do about missed lessons?
Do you plan how much you want to get through in a certain amount of time?
Have you found yourself getting behind your schedule this year?
Why did you get behind?
What did you do about it?
How do you decide when to move on to a new concept?
How do you know you've spent enough time teaching a concept?
How do you know that the children have understood a concept?
About how many children have little trouble in understanding the work?
Are there some children who always seem to have difficulty in understanding?
About how many seem to have trouble?
What do you do if 3 or 4 children don't understand?
What do you do if ten or more don't seem to understand?
What percentage of the class would you like to understand a concept before you move on?
What percentage of arithmetic time would you estimate is spent on new material?
What percentage of time is spent reviewing concepts already taught?
If you had to choose between covering the year's work for grade three, or making sure that most of the children have really understood a lesser amount, which would you choose and why?

Activities

Describe a successful activity in reading.
Describe a successful activity in arithmetic.
Describe an unsuccessful activity in reading.
Describe an unsuccessful activity in arithmetic.
What makes activities successful?
What makes activities unsuccessful?
What kinds of activities do you like to give the class?
Why?
How often do you give everyone the same assignment in reading?
How often do you give everyone the same assignment in arithmetic?
What are the advantages of giving everyone the same activity to do?
What are the disadvantages?
What kinds of things do children like to do in reading?
What kinds of things do children like to do in arithmetic?
What kinds of things do they dislike doing in reading?
What kinds of things do they dislike doing in arithmetic?
How can you tell if they like or dislike something?
What kinds of activities sustain the greatest amount of attention?
What kinds of activities get poor attention from the class?
APPENDIX 5 - CURRICULAR MATERIALS FOR GRADE 3 CLASSES

Prescribed * and Authorized Materials for Grade 3

Language Arts (Reading)

Reading 720 Clymer et al. (Ginn and Company)

Level 6 One To Grow On

Level 7 The Dog Next Door And Other Stories

Level 8 How It Is Nowadays

Level 9 Inside Out

Language Arts (Spelling)

Teaching Spelling, Ves Thomas, 2nd Edition (Gage)

Canadian Spelling Program Thomas and Braun Teacher's Edition 3 (Gage)

Spell-Write Sack et al., Revised Edition, Student Text 3 (Edu-Media)

Language Arts (Dictionaries)

The Canadian Dictionary: Avis (Gage)

Language

Starting Points in Language, Revised Edition Student Text, Level P (Ginn)

Mathematics

Eicholtz, O'Daffer: Investigating School Mathematics 3 (Addison-Wesley)

Elliott et al.: Project Mathematics 3 (Holt, Rinehart and Winston)

Dilley et al.: Heath Elementary Mathematics 3 (D. C. Heath)

Note * Prescribed means: the "title is considered basic or essential for the majority of the students"
Authorized means: the "title is considered suitable to supplement the prescribed material"
(Catalogue of Learning Resources, Province of B.C. p. 4)
APPENDIX 6 - EXERCISE ON BASIC FACTS

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### APPENDIX 7 - EXERCISE ON REGROUPING

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APPENDIX 8 - TEACHER PREFERENCE SIMULATION

One aspect of teaching which is currently receiving attention from classroom researchers is the way teachers make decisions. Decision making is a complex process, and therefore difficult to study while it is actually happening in the classroom. The following exercise is intended to simulate some of the decisions with which teachers are confronted.

One of the perennial problems faced by educators is not enough time to cover all the work prescribed for a particular grade level. This difficulty is compounded, because some children learn much more slowly than others. Teachers are often frustrated because they feel that they cannot do justice to all the students in their class. Some children require a lot of the teacher's time in order to learn very basic things. Other children could forge ahead if only the teacher could devote more time to them. Obviously such a complex problem has no solution which is perfect. The purpose of this exercise is to get some insights into what experienced teachers consider to be reasonable solutions.

You are asked to imagine that you have a typical grade three class. In this class you have some academically capable students who have no difficulty with the grade three curriculum, and who you feel need to be challenged with enrichment activities. You have some average students who cope well with the grade three program, and you have some low achievers who find grade three work difficult, and for whom you need to modify the program. To keep matters relatively
simple you will be asked to consider only the reading program.

Assume that reading occupies 90 minutes of each day. You have divided the class into three groups, good readers, average readers and poor readers. You spend a certain amount of time each day instructing each reading group. You are asked to rate how happy, or satisfied, you would be if each group covered a certain number of stories, in a certain amount of time. For example if the good readers (the high group) covered 150 stories in the year, with only 30 minutes of instruction per day, you would probably be very happy. However, if they covered only 50 stories with 90 minutes of instruction per day, you would probably be less satisfied. Your happiness scale runs from 1 (not satisfied) to 10 (very satisfied).

Directions Indicate how happy or satisfied you would feel if a particular group of students covered a certain number of stories in a certain amount of time. Use a numeral from 1 to 10. Numeral 1 means least happiness; 4, 5 and 6 mean that your happiness is increasing while 10 indicates the most satisfaction. Try to use all of the numerals to indicate your relative satisfaction: make sure that you use 1 and 10 at least once.

Reading groups
HIGH = the top group of good readers
AVERAGE = the middle group of average readers
LOW = the bottom group of poor readers
<table>
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<th>Stories</th>
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Directions  This exercise asks you to consider degree of learning and amount of time spent in instruction. Some children learn things well, others learn to a reasonable degree, and yet others may demonstrate an unsatisfactory degree of learning. Indicate how happy or satisfied you would feel if a particular group of students learned to a particular degree in a certain amount of time. Use a numeral from 1 to 10. Numeral 1 means least happy or satisfied; 4, 5 and 6 mean that your happiness is increasing, while 10 indicates the most satisfaction. Indicate your happiness on the blank line. Try to use all the numerals to indicate your relative satisfaction: make sure that you use 1 and 10 at least once.

Degree of learning
GOOD = children have learned well and demonstrate a good deal of proficiency in reading
SATISFACTORY = children have learned well enough to maintain average progress through the grade three reading program
UNSATISFACTORY = children demonstrate a lack of proficiency in grade three reading skills
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